The capital ship controversy in the interwar Royal Navy : an operational and tactical reassessment.

Moretz, Joseph Alan

THE ROYAL NAVY AND THE CAPITAL SHIP CONTROVERSY OF THE INTERWAR PERIOD: AN OPERATIONAL AND TACTICAL REASSESSMENT

Joseph Alan Moretz

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TABLE OF CONTENTS

CHAPTER		PAGE
ACKNOWLEDGEMENTS		5
ABSTRACT		7
PART I		
	Introduction	9
	Introduction	9
	The Elements of the Controversy	16
I	The Expectation of Naval Warfare and the Experience of the Late War	22
	The Expectation of Naval Warfare and the Operational Experience of the Late War	22
	Aviation in the Royal Navy	25
	Submarine Development and its Employment in the War	29
	Offensive and Defensive Mining During the 1914-1918 War	30
	Surface Action in the Great War	32
	Gunnery and Torpedo Fire	36
	Night-Fighting	46
	Identification	49
	Scouting and Reconnaissance	52
	Command and Control	56
	Capital Ship Protection	59
	Manoeuvre	60
	Summary	62
II	The Influence of Naval Arms Control and the Treasury on the Interwar Royal Navy	64
	The Aftermath of the Great War and the Washington Conference of 1921-1922	67
	The London Naval Conference of 1930	77
	The London Naval Conference of 1935, the Anglo-German Naval Agreement, and the End of the Naval Arms Limitation Process	82
	The Naval Estimates of the Interwar Era	86
	The Impact of Finance on the Royal Navy and the Naval Arms Limitation Process Evaluated	91
PART II		
III	The Evolution of Naval Weaponry and the Capital Ship: The Offence, the Defence, and the Threat	117
	The Distinctions in Royal Navy Capital Ships	119
	The Offensive Characteristics of Battleships	

and Battle Cruisers 121
Main Armament 122
Secondary Armament 139
Tertiary Armament 144
Torpedo Armament on Royal Navy Capital Ships 145
Plotting: The Correlation of the Offence and the Defence 149
Strategical Plot 152
Tactical Plot 152
The Use of Aircraft on British Capital Ships 155
The Threat and the Means of Protection Employed in British Capital Ships 160
The Threat from Naval Gunnery 161
The Underwater Threat 164
The Air Threat 170
Damage Control 177
The Threat Evaluated 178
The Reconstruction of Capital Ships during the Interwar Era 185
Summary 186

PART III

IV British Naval Strategy of the Interwar Period . 188
A Hierarchical Structure of Warfare 189
Naval Strategy 191
Command of the Sea and Sea Control 193
Fleet-in-Being 194
Guerre de Course and Sea Denial 195
British Interwar Naval Strategy 196
The Threat and the Naval Response 202
War with France 206
War with Italy 207
War with Spain 209
War with Germany 209
War with Turkey 211
War with the Soviet Union 213
War with the United States 214
War with Japan 217
British Naval Strategy Evaluated 222

V The Capital Ship and Its Operational Employment in the Royal Navy During the Interwar Period 227
A Theoretical Continuum of Naval Operations 230
The Royal Navy Fleet Organisation of the Interwar Period 233
Missions of Naval Presence During the Interwar Period 240
Surveillance 251
Support to Civil Authorities Involving Capital Ships 262
Deterrence and Limited Naval Strikes 268
Summary: The Operational Justification of the Capital Ship 272

VI The Development of Fleet Tactics and the Role of the Capital Ship During the Interwar Period 274
Introduction 274
The Sources and Development of Tactical Doctrine in the Royal Navy 277
Gunnery and Torpedo Fire 279
Individual Ship Control (ACY) 290
Master Ship Control (MSC) 291
Main Armament Control (MAC) 295
Indirect Firing 295
Torpedo Control 296
Night-Fighting 299
Identification and Deception 306
Scouting and Reconnaissance 309
Manoeuvre 312
The Exercise Programme of the Royal Navy . 319
Summary 325

VII The Capital Ship Reconsidered: Assessment . . 332

APPENDICES

I Files not Held at the Public Record Office Relating to the Capital Ship Controversy . 338

II Naval Estimates of the Interwar Period . . . 343

III Areas of Royal Navy Operational Employment During the Interwar Era 345

IV Areas of Capital Ship Active Service Employment During the Interwar Era 346

V Significant Capital Ship Visits of the Interwar Era 347

VI Offensive Chemical Warfare in the Royal Navy 348

VII Battleship and Battle Cruiser Gunnery Problems Investigated in the 1919-1939 Period . . . 352

BIBLIOGRAPHY 354

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ABSTRACT

The 'capital ship controversy' of the interwar Royal Navy has been the subject of much discussion and previous research primarily focused on the grand strategic level of warfare and on the internecine debate between the Royal Air Force and the Senior Service. Singularly lacking from these earlier studies has been an assessment of how wedded the Navy actually was to the capital ship based on an evaluation of the Service's operational experience during the 1919-1939 period and the development of fleet tactical doctrine as revealed in its exercise programme. This dissertation evaluates the capital ship within the interwar Royal Navy by examining its place of prominence at the strategic, operational, and tactical levels of warfare.

The Introduction establishes the context of the capital ship controversy and reviews the many strands of the argument. Chapter I examines the operational experience of World War One and the state of Royal Navy tactical doctrine to 1919. Chapter II discusses the period's regime of naval arms control including the Washington Naval Agreement, the naval conferences of 1927, 1930 and 1935, and the Anglo-German Naval Agreement, and the role of finance as major determinants of the capital ship. Chapter III reviews the technical evolution of the capital ship during the 1919-1939 era, the offensive and defensive capabilities of heavy ships, and the several threats that challenged the supremacy of battleships and battle cruisers. Chapter IV offers a general review of naval strategy, discusses the several strands of British interwar naval strategy, considers the estimate of the naval threat, surveys the war plans developed and the place of the capital ship in the several plans developed. Chapter V evaluates the capital ship against a continuum defining the distinct phases of naval operations. Chapter VI reviews the sources of naval tactical doctrine, the

development of torpedo and gunnery concentration and the lessons drawn from the Service's exercise programme. The final chapter concludes that the Service's commitment to the capital ship was, by 1939, lukewarm at best, and that the type operated and under construction was tactically removed from the principles which gave rise to HMS Dreadnought.

PART I

INTRODUCTION

THE NATURE OF THE POSTWAR CAPITAL SHIP CONTROVERSY

> The question whether aircraft can sink battleships is but a small part of the greater issue whether the battle-fleet can fulfil the strategic role. Under the conditions now developing, has a rebuilt battle-fleet the promise of contributing in a way commensurate with its cost to the security of our sea communications and the flow of supplies upon which the nation's life depends?[1]
>
> B. H. Liddell Hart

Introduction. The armoured line-of-battle has long ceased to form a part of the Royal Navy. The very purpose of its existence reminds one of another age, as modern naval forces no longer exist primarily for fleet action, but are an integrated component of a combined arms force designed to exercise dominance over land and air no less than over the seas. Controversy was never far from the capital ship, the collective term that covered both the battleship and the battle cruiser. The fact that such vessels formed the core of the fleet for as long as they did is surely a testament to the persistence of the naval dogma of the late nineteenth century and the slow process by which naval thought evolved in an essentially inward-looking and conservative Service. Much has been written about the capital ship controversy. Bernard Brodie has shown that a debate of sorts existed within the Royal Navy as early as 1882 over one of the strands of the

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[1]B. H. Liddell Hart, 'Air, Land, and Sea,' The Times, 10 February 1936, Liddell Hart Papers, Liddell Hart Centre for Military Archives, King's College, London, Section 10 1936/35.

controversy, namely the acceptable size of a warship,[2] while the very concept behind the construction of Dreadnought[3] and the purported revolution that it heralded was the subject of contemporary disagreement.[4] Professor Kennedy has claimed that the 'end of the battleship was in sight when it was no longer able to command the seas without a bevy of escorts....'[5] And yet whilst it is true that with the rise of the submarine, the torpedo boat destroyer, the naval mine, and the aeroplane, capital ships required a host of supporting auxiliary vessels, the same argument applies equally to the aircraft carrier, the inheritor of the capital ship mantle. Professor Kennedy's assertion is not therefore sufficient in itself to explain why the battleship and battle cruiser no longer form the backbone of naval power.

Fundamentally, though, the nature of the controversy surrounding the capital ship changed with the arrival of the aeroplane. Previously, the controversy was very much an intra-Service affair surrounding the relative merits of different classes of warships whose ultimate import would be confined to the Royal Navy. The introduction of the aeroplane and the establishment of a separate air service altered the equation, and it is well to remember that the capital ship controversy of the 1919-1939 period was

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[2]Bernard Brodie, Sea Power in the Machine Age (New York: Greenwood Press, 1969), pp. 236-237.

[3]Commissioned 11 December 1906, armed with ten 12-inch guns, and of 18,000 tons displacement. See John Roberts, The Battleship Dreadnought (London: Conway Maritime Press, Ltd., 1992), p. 16. (n.b., the details of described ships are appropriate for the time under discussion.)

[4]Jon Tetsuro Sumida, 'The Historian as Contemporary Analyst: Sir Julian Corbett and Admiral Sir John Fisher,' James Goldrick and John Hattendorf, eds., Mahan is not Enough: The Proceedings of a Conference on the Works of Sir Julian Corbett and Admiral Sir Herbert Richmond (Newport: Naval War College Press, 1993), p. 127.

[5]Paul M. Kennedy, The Rise and Fall of British Naval Mastery (London: The Ashfield Press, 1990), p. 249.

essentially a multifaceted debate with the protagonists divided upon the future of not only the capital ship but of the surface navy itself. This last point is frequently ignored. At times, the debate was as much over finance and cost effectiveness,[6] organisational survival (particularly for the nascent Royal Air Force)[7] and strategic assumptions of the highest order regarding possible adversaries of the British Empire, as it was over the likely nature of a future naval war, the technical performance of differing weapons, and how best to maintain Britain's maritime security.

Still, whilst this writer accepts the broader strategic dimensions of the controversy, it must be remarked that singularly missing from any previous investigation has been a systematic analysis of the Royal Navy's operational experience with the capital ship and the development of its fleet tactics during the interwar period. That this has been the case is all the more surprising as the controversy was fundamentally an argument over the operational value of heavy ships and their ability to support Britain's declared naval strategy. Accepting that capital ships were at risk from the submarine, the naval mine, flotilla forces, and the air, what lessons were drawn by the Royal Navy regarding the capital ship's continuing utility and survivability from the many fleet exercises of the period, from the controlled technical experiments carried out against warships, and from the experience of its operational commitments? Further, it must be remarked that the degree to which the period's

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[6]The 'Report of the Sub-Committee of the Committee of Imperial Defence on the Vulnerability of Capital Ships to Air Attack,' CMD 5301, November 1936, determined that '43 twin-engined medium bombers as the nearest approximation possible to the equivalent in cost of one capital ship...', p. 13, Liddell Hart Papers, 10/1936/91.

[7]See Geoffrey Till, 'Airpower and the Battleship in the 1920's,' Bryan Ranft, ed., Technical Change and British Naval Policy 1860-1939 (London: Hodder and Stoughton, 1977), p. 109.

regime of naval arms control and of strict financial stringency affected the operational role of the capital ship and the development of fleet tactics has never been adequately assessed. Finally, much of the present historiography is based upon the official Departmental papers lodged at the Public Record Office, Kew. Invaluable and essential as these records are, they are also incomplete. The vast majority of Admiralty files held at the Public Record Office (PRO) consist primarily of administrative and technical data. The conventional view is that any void in the official record is the result of files having been weeded or simply lost over time.[8] This explanation is inadequate, as it fails to acknowledge that certain files are still being withheld for security reasons,[9] whilst other files released represent only partial collections.[10] The number of such files in question, and their bearing on the controversy is unknown to this writer, yet the absence of records dealing with specific war plans, and the Service's assessment of how it planned to fight a fleet action against certain naval powers renders a definitive judgement on the capital ship controversy impossible. In the absence of the missing official records discussed in Appendix I, this writer will rely heavily on contemporary accounts of fleet exercises as summarised in surviving midshipmen journals, on the unofficial correspondence of naval officers, and on a scrutiny of the

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[8]Robert Jackson, Strike from the Sea: A Survey of British of Naval Air Operations, 1909-1969 (London: Arthur Barker, Limited, 1970), pp. 49-50. Two examples of Admiralty documents not held at the PRO but, nevertheless, surviving include 'O.U. 6118(8), War Vessels Silhouette Identification Book, Atlantic and Pacific,' November 1938 and 'O.U. 6118(9), War Vessels Silhouette Identification Book, Soviet Union,' dated September 1938. Both are retained privately by the author.

[9]Letter from I. D. Goode, Ministry of Defence, to J. A. Moretz dated 24 April 1998.

[10]For example, ADM 223/488, 'Mediterranean,' by Charles Morgan, omits the first 93 pages of this internal history.

official records that have been released in order to evaluate the capital ship. This study investigates the capital ship within the Royal Navy at the operational and tactical levels of warfare. It examines the impact of finance and naval arms control on the interwar Royal Navy and assesses their impact on the operational employment and tactical development of battleships and battle cruisers. Further, British naval policy of the 1919-1939 period is explored in order that the operational employment and tactical development of the capital ship can be understood within the overall strategic context of the period.

Innovation has been a hallmark of the Royal Navy. It readily accepted the aeroplane, adopted it for use on its surface ships, and took the lead in developing the aircraft carrier. Often criticised for its belated recognition of the submarine threat during the 1914-1918 war, it is frequently forgotten that the Royal Navy enjoyed a marked numerical superiority in that type of vessel at the outbreak of the war over her primary Central Power rival: 73 to 31.[11] If, therefore, successive Boards of Admiralty during the interwar period argued for retention of the capital ship (to the chagrin of officers such as Admiral Sir Herbert Richmond[12] and Captain Russell Grenfell)[13] it is right to question the extent to which such differences of opinion were the result of differing strategic visions,

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[11]Paul G. Halpern, A Naval History of World War I (Annapolis: Naval Institute Press, 1994), p. 8.

[12]Admiral Sir Herbert K. Richmond (1871-1946). Commanding Officer, Dreadnought (1909); Assistant Director of Plans, Admiralty (1913-15); Commanding Officer, HMS Conqueror (1917); Commanding Officer, HMS Erin (1919); President, Royal Naval War College, Greenwich (1920-23); first Commandant of the Imperial Defence College (1927-28); retired 1931.

[13]Author, inter alia, of Sea Power in the Next War (London: Geoffrey Bles, 1938) and 'Our Naval Needs,' Journal of the Royal United Services Institution, August 1939, pp. 492-507. Commissioned in 1916 and present at the Battle of Jutland in HMS Revenge.

operational experience, and tactical understanding. Richmond was certainly versed in tactical thinking, if not necessarily in the details of weapon system performance; he lectured in tactics as well as in strategy and policy at the Royal Naval War College. Yet, a review of his papers reveals that while he accepted the primacy of the battleship at the tactical level, he doubted its role at the strategic level. It is worth quoting Richmond at some length on this dichotomy in his thinking. Addressing the battleship at the tactical level, the Admiral argued that:

> It is a principle to which reference has been made earlier that the attack should be made upon the vital part of the enemy. Which of these bodies is the most important? This question admits of one answer only - the battleships. They carry the heavy artillery, the dominant weapon of a naval force: without their protection the smaller craft cannot offer combat. They are the support of all other vessels in all the theatres of operations - at any rate for the present. This admits no argument. It then follows that the attack should be made upon the battleships, and the efforts of our <u>fleet</u> should be concentrated upon their destruction.[14]

Yet, when addressing the issue of the battleship during a discussion on strategy, Richmond noted:

> Recently, the following has been put forward as reasons why battleships should continue to be built. First, that they are the most powerful units afloat. Second, that we have always had battleships. Third, that the French Navy suffered shipwreck under the influence of the school of Admiral Aube which aimed at substituting the torpedo boat for the battleship, and we shall do the same if we continue building the type. Fourth, that a prophylactic to every form of attack is discoverable and that even now we have mastered the submarine.
>
> To my mind none of these amounts to a <u>logical</u> reason. I do not call them

---

[14]'Lectures at Royal Naval War College, Greenwich, Spring Session 1920, Volume V, Tactics,' p. 22, Admiral Sir Herbert Richmond Papers, National Maritime Museum, Greenwich, NMM/RIC/10/2. Original emphasis.

arguments, but affirmations. The statement that battleships are the most powerful units afloat means nothing unless you say what you mean by "powerful". If power is your aim, you might say that a floating fort like the "Livadia" is more powerful than a destroyer. Power is purely a question of adaptability to function. If the battleship is the type that can most effectually fulfil the function that your strategy demands of her, she is powerful: if she does not, she is a waste of money. We must therefore make our minds absolutely clear as to the functions of the battleship, and of the different units of the fleet, which derive naturally from the functions of the Navy, which in turn derive from the object of war.[15]

One can view Richmond's latter statement as a refutation of everything argued in his first declaration regarding naval tactics and the battleship. No grounds are offered by Richmond as to whether the battleship at the tactical level is capable of fulfilling the strategic function for which it was conceived, and his argument that battleships, endowed as they are with the fleet's heavy artillery, are, therefore, the dominant arm is a tautological affirmation at best. Whether Richmond was aware of the contradictions in his argument is unknown. Baugh observes that as a serving officer, Richmond probably compromised his views at times in order not to offend colleagues.[16] That may be the case, particularly in the immediate aftermath of war when future naval employment was uncertain.[17] It is just as likely, however, that Richmond addressed the tactical issues surrounding the capital ship independent of

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[15]'Lectures given at R.N. War College, Greenwich during Autumn Session 1920, Volume 1, Strategy II,' p. 20, Richmond Papers, NMM/RIC/10/4. Original emphasis.

[16]Daniel A. Baugh, 'Admiral Sir Herbert Richmond and the Objects of Sea Power, Goldrick and Hattendorf, eds., Mahan is not Enough, pp. 33-34.

[17]D. M. Schurman, The Education of a Navy: The Development of British Naval Thought, 1867-1914 (London: Cassell, 1965), p. 115.

strategic issues, although he was philosophically disposed to argue for an integrated approach to naval thought. Ultimately, Richmond was a macro, and not a micro, naval thinker, and his surviving tactical discourses are void of any reference to the progress made in the gunnery and torpedo arms as recorded in the confidential book series issued by the Naval Staff.

The Elements of the Controversy. Many arguments were raised by the detractors of the capital ship in doubting its continuing efficacy, and these arguments addressed strategic, operational, and tactical considerations. Previous examinations of the issue have focused most prominently on the strategic level between the advocates of airpower and seapower. Of the many issues raised, the following were the more salient:

> What attributes defined a capital ship?[18]
>
> To what extent was the capital ship at risk from the air threat?[19]
>
> To what extent were the submarine and the torpedo a threat to the capital ship?[20]
>
> What was the proper role of the battle cruiser?[21]
>
> What was the proper balance between armament, protection, and speed to be aimed

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[18]Richmond lecture, 'Policy I,' delivered 2 May 1922, Royal Naval College, Greenwich, Richmond Papers, NMM/RIC/11/2.

[19]Draft report 'Committee of Imperial Defence Sub-Committee to Take Evidence on the Question of the Capital Ship in the Royal Navy,' p. 8, Admiral of the Fleet Earl Beatty Papers, National Maritime Museum, Greenwich, NMM/BTY/8/4/1.

[20]ADM 1/8658/61, Commanding Officer, HMS Conquest letter No.028/147 dated 2 April 1924 to Commander-in-Chief, Atlantic Fleet.

[21]Chatfield letter dated 11 May 1934 to Admiral Sir William Fisher, Commander-in-Chief, Mediterranean, Admiral of the Fleet Lord Chatfield Papers, National Maritime Museum, Greenwich, NMM/CHT/4/5.

at in a capital ship?[22]

What was it that dictated the size of a capital ship?[23]

What was the purpose of the capital ship?[24]

What was the function of a capital ship?[25]

Can the functions of the capital ship be performed by aircraft?[26]

What was to be the priority of capital ship construction in relation to other defence requirements?[27]

What type of capital ships could the Royal Navy expect to face in a future war?[28]

Could a fleet without capital ships be expected to prevail against a fleet with capital ships?[29]

How efficient was a modern capital ship?[30]

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[22]Chatfield speech to the Institute of Naval Architects, May 1933, NMM/CHT/3/6.

[23]Admiral Sir William H. Henderson, 'What is it that Dictates the Size of the Fighting Ship?' Naval Review, Volume XVIII, 1930, pp. 1-56.

[24]Richmond lecture on Strategy, pp. 2-3, Royal Naval College, Greenwich, Autumn Session 1920, Richmond Papers, NMM/RIC/10/4.

[25]Ibid., p. 20.

[26]'Report of the Sub-Committee of the Committee of Imperial Defence, CMD 5301, November 1936, On the Vulnerability of Capital Ships to Air Attack,' Richmond Papers, NMM/RIC/6/3.

[27]Roger M. Bellairs letter to Richmond dated 16 December 1920, Richmond Papers, NMM/RIC/6/4.

[28]ADM 1/8580/22, Jellicoe 'Report of Visit to U.S.A.' letter No. 61/P.230 dated 20 January 1920 to Admiralty.

[29]ADM 1/8597/9, 'The Capital Ship,' Commander-in-Chief, Atlantic Fleet to Admiralty letter No.36/A.H.0013 dated 10 January 1921.

[30]'Teeoh,' 'The Battleship Question,' Naval Review, Volume XXIV, 1936, p. 234.

Still, the controversy was always more than just the relative value of the battleship and battle cruiser and their technical attributes. The heart of the controversy struck at the operational doctrine of the Royal Navy and the tactics to be employed by the battlefleet.[31] To this end, the capital ship controversy raised the additional questions of:

> Should capital ships still operate as a battlefleet?[32]
>
> Under what conditions should divisional tactics be adopted?[33]
>
> In light of war experience, what characteristics should be adopted in any new capital ship built?[34]
>
> How effective was capital ship anti-aircraft fire likely to be?[35]

The advocates for and against the capital ship were rarely as dogmatic in their views as their critics and interpreters have commonly asserted, and Sir Basil Liddell

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[31]The term 'battlefleet' is frequently used, but rarely defined. Frequently, it appears as a synonym for the fleet as a tactical entity. Officially, to the Royal Navy, the battlefleet was the tactical union of two or more battle squadrons. The battle squadron, in turn, was the tactical union of two or more battleships. The battlefleet did not include battle cruisers, aircraft carriers, cruisers, destroyers, submarines, or auxiliary forces operating with the fleet.

[32]Undated and unsigned paper, Admiral Sir William Fisher Papers, National Maritime Museum, Greenwich, NMM/FHR/11.

[33]H. G. Thursfield lecture 'Development of Tactics in the Grand Fleet,' delivered 7 February 1922, Royal Naval College, Greenwich, Rear Admiral Henry George Thursfield Papers, National Maritime Museum, Greenwich, NMM/THU/107.

[34]ADM 1/8586/70, 'C.B. 01557. Final Report of the Post-War Questions Committee' dated 27 March 1920.

[35]Tizard letter to Professor R. H. Fowler dated 17 December 1936, Sir Henry H. Tizard Papers, Imperial War Museum, London, IWM/HHT/103.

Hart's assertion that a 'battleship had long been to an admiral what a cathedral is to a bishop' is not only wide of the mark, but pernicious in its implication.[36] Given a debate that was to span the interwar period, that an officer could modify his views on such a fundamental naval issue may be regarded as a natural evolution. Moreover, in claiming a continuing role for capital ships, the corollary did not necessarily imply that the other naval arms were redundant; thus, an officer such as Admiral of the Fleet Sir Ernle Chatfield[37] could press with equal vigour for control of the Fleet Air Arm and for new capital ship construction. That such an experienced officer could be equally committed to improving both the surface and air arms of the Navy was frequently overlooked by his contemporary detractors. Nor was Chatfield, a renowned gunnery enthusiast, an exception in being an officer who recognised the value of the other naval arms. During his naval mission to Canada, Admiral of the Fleet Viscount Jellicoe[38] advocated a balanced naval force for the Dominion including battle cruisers, light cruisers, destroyers,

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[36]Arthur J. Marder, From the Dardanelles to Oran: Studies of the Royal Navy in War and Peace 1915-1940 (London: Oxford University Press, 1974), pp. 85-86.

[37]Alfred Ernle Montacute Chatfield (1873-1967). Flag Captain in HMS Lion, (1914-1916); Flag Captain and Fleet Gunnery Officer, Grand Fleet (1917-1919); Fourth Sea Lord (1919-1920); Assistant Chief of Naval Staff (1920-1922); Third Sea Lord and Controller (1925-1928); Commander-in-Chief, Atlantic Fleet (1929-1930); Commander-in-Chief, Mediterranean (1930-1932); First Sea Lord (1933-1938); Minister for Coordination of Defence (1939-1940); created Baron Chatfield (1937). It is difficult to minimise the enormity of his presence on the interwar Royal Navy.

[38]John Rushworth, First Earl Jellicoe (1859-1935). Director of Naval Ordnance (1905); Rear Admiral (1907); Vice Admiral Commanding Atlantic Fleet (1910); Second Sea Lord (1912); acting Admiral and Commander-in-Chief, Grand Fleet (1914-1916); senior British officer at Battle of Jutland (1916); First Sea Lord (1916-1917); created Viscount Jellicoe of Scapa (1918) and promoted Admiral of the Fleet (1919).

submarines, and patrol craft.[39] Assuming naval estimates of £5,000,000, £3,500,000, or £1,000,000 respectively, the following force levels were proposed:

£5 Million $25 Million	£3.5 Million $17 Million	£1 Million $5 Million
2 battle cruisers	1 battle cruiser	
7 light cruisers	5 light cruisers	
1 flotilla leader	1 flotilla leader	
12 destroyers	6 destroyers	
16 submarines	8 submarines	8 submarines[40]

Jellicoe prepared the report with a desire that the Royal Canadian Navy should form an integrated element of a greater Imperial Navy. What stands out from his recommendations is that while the contribution of strong surface forces, including the provision of battle cruisers, was a desirable contribution by Canada, what was of fundamental importance was the fielding of a submarine component. Nor did Jellicoe offer a strictly traditional assessment of the naval requirements of the fledgling Royal Australian Navy. Following his naval mission of 1919, amongst his report's proposals was the admission that 'One of the earliest requirements of the Commonwealth is the acquisition or loan of an Aircraft Carrier.'[41]

On balance, to understand the capital ship controversy, it is necessary to recall that it operated against the backdrop of the British naval experience of the 1914-1918 conflict. Left unsaid publicly, but very much present in the calculations of the severest critics, particularly those critics within the Royal Navy, was that

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[39]'Report of Admiral of the Fleet Viscount Jellicoe of Scapa, G.C.B., O.M., G.C.V.O. on Naval Mission to the Dominion of Canada (November-December, 1919),' Volume I, Jellicoe Papers, British Library, Additional MSS 49,055.

[40]Ibid., p. 15.

[41]'Report of Admiral of the Fleet Viscount Jellicoe of Scapa G.C.B., O.M., G.C.V.O. On Naval Mission to the Commonwealth of Australia (May-August, 1919),' Volume I, p.11, Jellicoe Papers, Additional MSS 49,048.

the Service was never again likely to enjoy the advantages of numerical superiority in materiel, the benefits of geography, and the fruits of special intelligence against an adversary.[42] If a navy so endowed could not secure command of the seas through its battlefleet, then perhaps the fault resided in the nature of the battlefleet itself and its constituent unit, the capital ship. A review of the Service's operational and tactical experience of the late war is therefore appropriate, prior to beginning a detailed assessment of the interwar capital ship controversy.

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[42]On this point, the following is cited: 'the Admiralty had at their disposal priceless information which we may never hope to have again in the future, and which they certainly did not make the best use of.' from 'Summing Up by Director, Royal Naval Staff College on Jutland Lectures 1927:' Captain Allan Thomas George Cumberland Peachey Papers, National Maritime Museum, Greenwich, NMM/PCY/1.

CHAPTER I

THE EXPECTATION OF NAVAL WARFARE AND THE EXPERIENCE OF THE LATE WAR

> I wish to express to the Flag Officers, Captains, Officers and Men of the Grand Fleet my congratulations on the victory which has been gained over the sea power of our enemy.
>
> The greatness of this achievement is in no way lessened by the fact that the final episode did not take the form of a Fleet Action....[1]
>
> Admiral Sir David Beatty

> Throughout these four years every sane Englishman's mind has rested in confidence on the Navy, and now when the end has come the British Navy is more clearly than ever the saviour of the country and the destroyer of the Central Powers. How true it is and how often forgotten that the final collapse is the direct result of our command of the seas![2]
>
> Sir Walter Runciman

The Expectation of Naval Warfare and the Operational Experience of the Late War. For Great Britain, the Royal Navy was viewed as the nation's first line of defence, and as an island nation it recognised that communications with its vast empire were only possible while its maritime routes remained open. With the dramatic rise of the German Navy under Kaiser Wilhelm II and Grand Admiral Alfred von Tirpitz, the Royal Navy had long considered that it might have to contest command of the sea with the High Sea Fleet.

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[1]Commander-in-Chief Grand Fleet memorandum H.F. 1199/6 dated 21 November 1918, Vice Admiral Sir Geoffrey Blake Papers, National Maritime Museum, Greenwich, NMM/BLE/2.

[2]Runciman letter to Jellicoe dated 14 November 1918 cited in Temple Patterson, ed., Jellicoe Papers, Volume II, p. 281.

To this end, it resolved to maintain its superiority over the Imperial German Navy. Primarily, this was measured in the number of capital ships, but no less important in maintaining this superiority was the manning of the Fleet, the development of extensive dockyard and supporting bases, and the courting of naval partners such as France and Japan to facilitate the concentration of its heavy ships in Home Waters. A treaty reached with Japan in 1902, and originally aimed at addressing a threat from Russia, was accordingly renewed in 1911 with an eye towards Germany.[3] With a similar aim in mind, Great Britain reached agreement with France in February 1913 that the French Navy would assume primacy for operations in the Mediterranean area.[4]

In the event of war the Royal Navy would impose a blockade against Germany, defeat in detail any ships found outside the blockade zone, and seek a fleet action with the High Sea Fleet under terms most favourable to the main striking arm of the Royal Navy--the Grand Fleet. In practice, this meant a resolve not to accept battle close to the Heligoland Bight where the numerical superiority of the Grand Fleet could be neutralised by German defensive mining. In a fleet action close to Germany proper, damaged ships might have to be abandoned or sunk due to the distance the Grand Fleet would have found itself from its main anchorages at Scapa Flow, Rosyth, and Cromarty. It has been said that the initiative for any fleet action resided primarily with the Germans. This is only partly correct. With the rise of wireless telegraphy as a means of controlling naval movements and the corresponding development of signals intelligence and cryptanalysis to divine the pending actions of an opposing naval force, the

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[3]Thomas H. Buckley and Edwin B. Strong, Jr., American Foreign and National Security Policies, 1914-1965 (Knoxville: University of Press, 1987), p. 64.

[4]Dan Van Der Vat, The Ship that Changed the World: The Escape of the Goeben to the Dardanelles in 1914 (Bethesda: Adler & Adler, 1986), p. 34.

Admiralty's attack on German naval ciphers allowed it the option to refuse battle if it so desired.

Still, it is important to remember that fleet action has rarely existed as an end in itself, but, rather, has more frequently been the result of one navy responding to an ongoing operation of another, such as the threat of an amphibious landing or the escorting of a convoy.[5] Thus, if the Grand Fleet was intent on forcing a fleet action with the High Sea Fleet, it could have advanced the issue by threatening an amphibious landing on the German coast--a plan that was very close to the heart of Admiral of the Fleet Lord Fisher[6] when he succeeded Prince Louis of Battenberg[7] as First Sea Lord. That it never did attempt such an assault highlights the fact that the British strategic aim of maintaining command of the sea was not in itself dependent on securing a victory over the main fleet units of the Imperial German Navy. As the geographic position of the British Isles lay astride the sea lanes of the North Sea, Germany faced the immediate problem that any shipping destined for her must perforce pass through areas under British control. This was a problem that could be discounted in the event of a short war, but which assumed a greater degree of importance, if the German Army could not deliver a quick military decision.

Given the proximity of its main naval rival and the command arrangements established with its allies, the French and the Italians, for the Mediterranean area, the

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[5]Wayne P. Hughes, Jr., Fleet Tactics: Theory and Practice (Annapolis: Naval Institute Press, 1986), p. 33.

[6]Admiral of the Fleet Sir John Arbuthnot Fisher (1841-1920). Commander-in-Chief, Mediterranean (1899-1902); First Sea Lord (1904-1910) and (1914-1915). Raised to the peerage as Baron Fisher of Kilverstone (1909).

[7]His Serene Highness Prince Louis of Battenberg (1854-1921); First Sea Lord (1912-1914). Forced to resign his post because of his Germanic connections, he was ennobled as the Marquess of Milford Haven (1917) and promoted Admiral of the Fleet (1921).

main theatre for the Royal Navy was always going to be the North Sea; this was especially true for capital ship operations.[8] Nevertheless, both in response to Central Power naval actions, and, also in pursuit of its own strategic aims, operations in the Mediterranean, the Atlantic, the Near East, and the Pacific Ocean areas featured prominently during the course of the Great War for the Royal Navy. Although of a secondary nature, it would belittle these efforts to view them as of no consequence. At times, these peripheral theatres witnessed operations of a most considerable scale. Such was certainly the case during the combined operations associated with the Gallipoli campaign of 1915-1916, and the ramifications of these out of area events were at times most pronounced. Whilst it is true that much of pre-war naval thought and planning centred on a potential clash of battlefleets, technology had fostered new weapons, such as the aeroplane, the mine, and the submarine that would move naval warfare into the realm of the three-dimensional. The Navy was alive to the new tools of war and a brief discussion of their rise and development up to the end of the war is now in order.

Aviation in the Royal Navy. Even prior to the First World War, the Service had begun using aircraft in support of fleet operations. Flying instruction began in March 1911, and the first naval air unit was formed at Eastchurch in November of the same year. In July 1914, the Royal Naval Air Service (RNAS) was formed from the Naval Wing of the Royal Flying Corps,[9] and when hostilities opened the RNAS had roughly fifty serviceable aeroplanes and 50

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[8]For a discussion of operations in the Mediterranean see Paul G. Halpern, The Naval War in the Mediterranean 1914-1918 (Annapolis: Naval Institute Press, 1987.

[9]Peter Lewis, Squadron Histories: R.F.C., R.N.A.S. and R.A.F. 1912-1959 (London: Putnam, 1959), p. 69 and pp. 171-172.

officers and 500 ratings.[10] From such humble beginnings a force was to emerge that, by the time of its absorption into the Royal Air Force in April 1918, stood at 55,066 officers and men and 2929 aircraft.[11] Yet, if British naval airpower had grown appreciably, it had grown haphazardly. During its expansion it had found itself responsible for the anti-aircraft defence of Great Britain, strategic bombing, and even for armoured cars. Yet, progress there was and capital ships were fitted with platforms for flying off aircraft and employed kite balloons to assist in reconnaissance and gunnery observation. Moreover, tenders and the first aircraft carriers, rudimentary as they were, joined the fleet, so that by the end of September 1918 the Royal Navy possessed 3 large aircraft carriers, 9 smaller carriers, 1 kite balloon ship, and 24 seaplane lighters.[12] Certainly, however, the official assessment on the naval air arm's performance was guarded:

> Work with the Grand Fleet has been useful rather than spectacular. The principle of flying aeroplanes off the turret or decks of ships has been steadily developed which enables flights to be made in weather which would preclude the use of seaplanes....[13]

This view was no doubt shaped by the practical difficulties of operating aircraft in the demanding environment of the sea and by the performance limitations of the aeroplanes of the day.

Nevertheless, it is no exaggeration to assert that the Service initially embraced the aeroplane wholeheartedly and wasted little time in attempting to employ it in

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[10]ADM 1/8549/13, 'Appreciation of British Naval Effort, R.N.A.S. Aircraft Operations, Part 1'.

[11]Ibid.

[12]Admiralty report 'The British Naval Effort. 4th August 1914 to 11th November 1918,' Beatty Papers, NMM/BTY/7/10/14.

[13]Ibid.

operations. So much so, that an attack on the Zeppelin sheds of Cuxhaven in late October 1914 was attempted.[14] Serving in the cruiser HMS Arethusa as a junior officer, Hugh Miller recorded:

> We have just carried out a most hazardous operation which turned out a complete failure. If it now succeeded England would probably have been singing our praises, but it was unsuccessful and so no one will hear about it. We ran a great risk and carried out our part to the letter, but the other part failed.
>
> We left Harwich at 5.30 a.m. on Saturday with UNDAUNTED, 16 destroyers and HM Waterplane Carriers RIVIERA and ENGADINE. By Sunday morning we were creeping along the Schleswig Holstein Coast of Germany. At 4.48 a.m. we were within 12 miles of Heligoland to the Northward and here we stopped. The RIVIERA and ENGADINE commenced to get out their waterplanes (6 in all) and completed the operation before 6.a.m. The plan was to fly to Cuxhaven (50 miles off) and blow up the Zeppelin sheds there with bombs....It was soon obvious that all was not well. Three waterplanes were taxi-ing all over the place, like flies trying to get off fly paper, but only one was in the air, and 2 were doing nothing at all...apparently the rain had made them too heavy to fly.[15]

Ultimately, 'Plan Y,' as the attack on Cuxhaven was styled, was carried out in December 1914, but the results were meagre and the risks taken great. Again, Miller's impression in Arethusa is worth noting for the insight it provides on the dangers and limitations of early twentieth century naval air warfare:

> We were an easy bag for the German Battle Cruisers if they would only dare to pass our line of submarines ten of which were strung

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[14]Planning for the strike began in early October 1914, and a dry run of the operation was held on 18 October 1914 near Spithead. See War Diary, entries 11 and 17 October 1914, Lieutenant Commander R. Erskine Childers Papers, Imperial War Museum, London, IWM/PP/MCR/C28.

[15]Diary entry dated 26 October 1914, Paymaster Rear Admiral Hugh Miller Papers, Imperial War Museum, London, IWM/73/11/1.

out round Heligoland inside of us. At 8.45 a hostile waterplane - we did not recognise it as hostile until it was almost on us and sailed straight over the ship from stem to stern at a height of under 1000 feet I should think. She looked very big and the little iron crosses on her wings were quite obvious to us looking straight up at her it seemed as if she had only to hand out her bombs and they would fall on our deck causing great destruction. He dropped 4 bombs at us but they fell on either side between us and our destroyer...[16]

Miller continued with the British part of the operation:

> The Seaplane pilots do not appear to have done anything. One of the 3 pilots with us has not even dropped his bombs. The others report much fog over the land and although they dropped bombs they do not appear to have hit anything worth hitting either at Cuxhaven or elsewhere...[17]

Still, whatever the limitations in aircraft performance, or the dangers in such limited strike operations, the air was now a factor in almost all aspects of naval warfare to include strategic reconnaissance, convoy escort, and anti-submarine patrols. Tactically, aircraft were integrated into fleet operations, and by the final year of the war the Grand Fleet Battle Instructions recognised their increasing importance. Fleet aircraft were expected to conduct strategic long-range reconnaissance and tactical observation during the approach of the battlefleet and the subsequent engagement. Just as importantly, the fleet's organic aircraft were to deny the enemy reconnaissance by means of his aircraft.[18] Offensively, the aircraft of the Grand Fleet were expected to destroy the enemy's air reconnaissance, to conduct torpedo strikes on the capital

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[16]Ibid., entry dated 25 December 1914.

[17]Ibid.

[18]'Grand Fleet Battle Instructions' dated 1 January 1918, Beatty Papers, NMM/BTY/7/4/1.

ships of the High Sea Fleet, and to strafe the topsides of German destroyers and capital ships. Further, they were to attack any remotely-controlled motor boats or torpedo-hydroplanes approaching the fleet. Finally, aircraft were to assist the gun control of the fleet by observing the fall of shot for individual ships.[19] Certainly, given the day's technology, the instructions represented a robust assessment of the capabilities of the Grand Fleet's air forces.

Submarine Development and its Employment in the War. It has been remarked previously that the Royal Navy enjoyed a marked superiority over the Imperial German Navy in the number of submarines in commission at the start of the war. Yet, as it was fundamentally a weapon of sea denial and the prime task of the Royal Navy was to ensure access to the sea, it was a weapon of limited operational scope for Britain. However, given the reluctance of the Kaiser to risk the High Sea Fleet and the increasing effectiveness of the British blockade, it was only logical that the submarine would come to play a greater role in German naval operations. It promised to negate the numerical advantage of the Grand Fleet's surface warships and was extremely difficult to counter. The usefulness of the submarine in supporting German naval operations was recognised from the beginning:

> "Our object is to damage the British Fleet by means of offensive advances against the forces watching or blockading the German BIGHT, and also by means of a ruthless mining, and if possible, a S/M offensive carried as far as the British coasts..."[20]

For their part, the British appreciated that the underwater threat posed by both the submarine and the naval mine

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[19]Ibid.

[20]Precis of lecture 'German Naval Strategy, The War Order to the Fleet, August, 1914' by Commander J. F. Stevens, Royal Naval Staff College, Greenwich, Captain R. Oliver-Bellasis Papers, National Maritime Museum, Greenwich, NMM/BEL/151.

threatened the presumed supremacy of the Grand Fleet. Outlining his views to the Admiralty, the Commander-in-Chief, Grand Fleet, Admiral Sir John Jellicoe minuted:

> It is quite within the bounds of possibility that half of our battlefleet might be disabled by underwater attack before the guns opened fire at all if a false move is made, and I feel that I must constantly bear in mind the great probability of such an attack and be prepared, tactically, to prevent its success.[21]

This assessment was not much different from that of Fisher who wrote in January 1915 on the eve of the Dardanelles operation:

> We play into GERMANY's hands if we risk fighting ships in any subsidiary operation such as coastal bombardments or the attack of fortified places without military co-operation, for we thereby increase the possibility that the Germans may be able to engage our fleet with some approach to equality of strength...
>
> The second method of forcing the fleet out, that is to say, by attacks on the enemy's territory, is difficult. Attacks on German colonies are not sufficient to tempt it out and joint operations against continental GERMANY are impracticable in view of the enemy's strength in submarines.[22]

Offensive and Defensive Mining During the 1914-1918 War. In no other war has the influence of the naval mine been as great as during the 1914-1918 conflict, and it is indeed the case that the naval mine came of age during the First World War. That this was so owed much to geography, to the limitations in surface warship design, and to the inadequate means at first available to combat this weapon.

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[21]Commander-in-Chief, Grand Fleet letter No.339/H.F.0034 to Admiralty cited in precis of lecture 'Pre-Jutland Tactics and Command' by Commander G. E. Colpoys, Royal Naval Staff College, Greenwich, 1936 Session, Oliver-Bellasis Papers, NMM/BEL/151.

[22]First Sea Lord memorandum, dated 25 January 1915 cited in precis of lecture 'British Naval Strategy, II' by Commander H. S. Squance, Royal Naval College, Greenwich, 1936 Session, Oliver-Bellasis Papers, NMM/BEL/151.

The Royal Navy conducted both offensive and defensive mining operations, and, in turn, faced the perils of enemy mining. During the war the efficacy of mining operations was much debated--particularly as it placed prodigious demands on a class of naval vessel of which there never seemed to be enough, but of the latent danger of the mine there was little doubt. Whilst all types of naval vessels were at risk from the mine, the capital ship, by virtue of its value, size, and prestige appeared the most vulnerable and helpless, and confirmation of this is best demonstrated by the events surrounding the loss of HMS Audacious.[23] Audacious, in company with the Second Battle Squadron, struck a mine off the Irish coast in the morning hours of 27 October 1914 during a course of routine gunnery drill. Before the close of day, the battleship was lost; the striking feature of the tragedy was that not one member of the ship's company was lost.[24]

However, if the naval mine could be lethal, it could also be mastered. Increased screening by escort vessels and the fitting of paravanes to capital ships lessened the danger as the war progressed, but only new construction or substantial warship reconstruction could overcome any structural defects. Intelligence and reconnaissance identified static areas known to be mined, while Fleet guidance addressed the issue of enemy tactical mining.[25] To this end,

> The danger from mines dropped from retiring enemy cruisers must be guarded against. Ships should avoid crossing any

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[23]Commissioned 1913, armed with ten 13.5-inch guns, and of 28,000 tons displacement.

[24]A singular testament to a warship's vulnerability, perhaps? Still, a series of errors compounded the tragedy and ensured the loss of Audacious. See R. A. Burt, British Battleships of World War One (Annapolis: Naval Institute Press, 1986), pp. 183-186 for a discussion of the ship's loss.

[25]Diary entry dated 26 August 1914, Childers Papers, IWM/PP/MCR/C28.

> track passed over by the enemy but, if necessary to do so, are to cross it at right angles if possible. A continuous watch is to be kept to notice any mines being dropped.
> Note. (These may be fired out of stern tubes).[26]

The greatest risk to capital ships posed by enemy mining was in constricted waters that offered natural choke points or in waters close to fleet anchorages where manoeuvring room was at a premium.

Surface Action in the Great War. Only once during the 1914-1918 period did the main fleets of capital ships of the principal antagonists clash. The Battle of Jutland, fought on 31 May-1 June 1916, was a confused encounter in which poor visibility made control of the engagement by both commanders, Jellicoe of the Grand Fleet and Admiral Reinhard Scheer of the High Sea Fleet, difficult in the extreme. Any study of the capital ship controversy and the Royal Navy must be prefaced with an analysis of the Jutland engagement, as its shadow was to loom large over the remainder of the war and over the entire interwar period. It is perhaps a truism that in war more is often learnt through defeat than in victory. Captain Stephen Roskill has written that the Royal Navy was obsessed with learning the lessons of Jutland, and so at first glance it would appear.[27] Yet it is important to remember that prior to battle much of the Grand Fleet's doctrine was theory, and many of the faults later identified in method and equipment could only have been exposed under conditions of active service. Thus, to its credit, it was the precise aim of the Royal Navy to ensure that a second Jutland, with its

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[26]Memorandum No. 018 dated 25 November 1914 issued to Rear Admiral and Commanding Officers H.M. Ships & Vessels, Admiral Sir Richard F. Phillimore Papers, Imperial War Museum, IWM/66/9/1.

[27]Stephen Roskill, Naval Policy between the Wars, Volume I: The Period of Anglo-American Antagonism 1919-1929 (London: Collins, 1968), p. 533.

inconclusive outcome, should not occur.

Jutland, it is frequently claimed, was a tactical victory for the Germans whilst a strategic victory for the British. Over the German claim to tactical victory there can be little disagreement, if measured by losses sustained. Whilst it did not initially refuse battle when making contact with the British Battle Cruiser Fleet under the command of Vice Admiral Sir David Beatty,[28] the High Sea Fleet sought to retire when the main units of the Grand Fleet intervened. Still, whilst engaged with Beatty's force, the Germans inflicted telling blows and destroyed HMS Queen Mary[29] and HMS Indefatigable;[30] before the day was over another battle cruiser, HMS Invincible,[31] flying the flag of Rear Admiral the Honourable Sir Horace Hood[32] of the Third Battle Cruiser Squadron had succumbed to German fire.[33]

Jutland highlighted many deficiencies in both matériel and methodology within the Senior Service--deficiencies it

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[28]First Earl Beatty (1871-1936). Captain by the age of 29 and the Royal Navy's youngest flag officer before his fortieth birthday; Vice Admiral (1915); acting Admiral and Commander-in-Chief Grand Fleet (1916); created Earl and First Sea Lord (1919-1927).

[29]Commissioned 1913, armed with eight 13.5-inch guns, and of 31,000 tons displacement.

[30]Commissioned 1911, armed with eight 12-inch guns, of 22,000 tons displacement.

[31]Commissioned 1909, armed with eight 12-inch guns, and of 20,000 tons displacement.

[32]Rear Admiral the Honourable Horace L. A. Hood (1870-1916). Rear Admiral (1913); Naval Secretary to Mr. Churchill, and Commander Third Battle Cruiser Squadron (1915-16).

[33]The audit of Jutland was the loss of 3 battle cruisers, 3 armoured cruisers, 1 flotilla leader, and 7 destroyers by the Royal Navy whilst the High Sea Fleet lost a battle cruiser and a pre-dreadnought battleship, 4 light cruisers, and 5 destroyers. From N. J. M. Campbell, Jutland: An Analysis of the Fighting (Annapolis: Naval Institute Press, 1986), p. 338.

must be added that even if corrected may have not altered the outcome of the battle given the reluctance of the High Sea Fleet to continue the engagement and the visibility conditions prevailing. From poor coordination between the Operations and Intelligence Divisions of the Admiralty in handling signals intelligence and directing subordinate forces, such as the Harwich Force under the command of Reginald Tyrwhitt,[34] to the poor signalling and reporting procedures of the Grand Fleet's scouting forces, Jutland offered a host of lessons to be learned. The battle also highlighted other areas of concern including defective shells and dangerous handling procedures of ammunition charges, the failure to concentrate forces, and the difficulty of achieving tactical cohesion when forces shared disparate anchorages and did not regularly train together. Moreover, Jutland demonstrated that the issue of accepting a night time engagement had to be revisited and its associated tactics refined, and that ship recognition under conditions of minimal visibility had to be improved. Surely, Beatty's oft-repeated words when overheard to exclaim, '"Whats (sic) the matter with our bloody ships today"'[35] capture in a moment the frustrations felt within the Grand Fleet over its operational performance.

In the main, Jutland was a less than satisfactory affair for the British and controversy over the engagement was rife from the beginning. One naval officer, Philip Dumas, who served at the Admiralty during the war has recorded something of the immediate reckoning surrounding the battle:

> Jellicoe hesitated to fight as it was

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[34]Admiral of the Fleet Sir Reginald Yorke Tyrwhitt (1870-1951). Commander, Harwich Force (1914-1918); Commander, Third Light Cruiser Squadron (1921-1922); and Commander-in-Chief, China Station (1927-1929). Created baronet 1919.

[35]Beatty as cited by Arthur Roderick Lewis, Boy Telegraphist Arthur Roderick Lewis Papers, Imperial War Museum, London, IWM/MISC/1010/65/2.

> just dark & rather foggy about the German fleet during the night but there was sufficient fleet action for him & Beatty to claim very severe losses on the part of the Germans which the latter deny....The general idea in the Admiralty is that Jellicoe is making wild & almost unsubstantiated claims to cover what ought to have been a great victory & was - but heavens alone knows why - periously (sic) near a defeat. Beatty on the other hand has covered himself with glory...'[36]

While another was to note, 'It is a nasty knock and there is no denying it. We have engaged an inferior force & got the worst of it.'[37] Thus, Jutland not only failed by its inconclusiveness to become another Trafalgar, it damaged the standing of the Navy in the country and divided the Service over the responsibility, or culpability, for the outcome.

A future chapter will examine the modification of tactical thinking and the innovations in capital ship evolutions introduced in an effort to ensure its survivability and to make it a more effective weapon system. Not surprisingly, many of the steps pursued in tactical development were in direct response to the experience of the Great War and of the Jutland action in particular. From the earliest date, a vigorous attempt was made by both the Admiralty and the Grand Fleet to capture the lessons of that engagement. Within the Grand Fleet, committees were formed to investigate such aspects as ship construction and gunnery effectiveness, and from the Fleet Commander an order was issued requesting that:

> All battleships, battle-cruisers, cruisers and light-cruisers, engaged in the action during daylight on 31 May 1916, are to forward to the Admiralty their Dreyer

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[36]Diary entry dated 2 June 1916, Rear Admiral Philip W. Dumas Papers, Imperial War Museum, London, IWM/PP/MCR/96.

[37]Arthur J. Marder, Portrait of an Admiral: The Life and Papers of Sir Herbert Richmond (London: Cape, 1952), p. 213.

> table plotting charts and other range and bearing records that they may have of the period of time during which they were in sight of the enemy.[38]

A summation of the specific tactical deficiencies identified is now appropriate.

Gunnery and Torpedo Fire. With the development of rifled artillery of ever larger calibres, the theoretical range at which a naval engagement could take place had vastly increased. An immediate problem, though, was that firing to a greater range did not come with a commensurate ability to actually hit anything. The difficulties of registering fire on a warship steaming at 20 knots at distances of ten to twelve miles in varying degrees of visibility promised to expend a capital ship's supply of ammunition unless newer means of fire control were devised. Still, it was not enough just to hit, but to hit continuously, and, moreover, to hit at the earliest possible moment. Or, as one authoritative source put it, 'Battleship tactics are mainly the handmaiden of gunnery: they exist to help bring the greatest volume of hitting on the enemy.'[39] It was observed that at Jutland, the German method for registering the range was superior to that employed by the Grand Fleet, and, in an after-action report from the battle cruiser Lion,[40] it was noted that:

> At the commencement of the recent action it is known that the fourth salvo from an enemy ship was fired at 1½ minutes, while the fourth salvo from our ship was fired at 4 minutes. This shews that the enemy have a system of ranging by a

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[38]Grand Fleet memorandum H.F.1187/68 dated 24 September 1916 to Flag Officers, Commodores, and Officers in command of H.M. Ships, Beatty Papers, NMM/BTY/6/6/7.

[39]Reginald Bacon, The Jutland Scandal (London: Hutchinson & Company, 1933), p. 71. Original emphasis.

[40]Commissioned 1912, armed with eight 13.5-inch guns, and of 30,000 tons displacement.

succession of rapid salvoes.

There are undoubtedly great advantages in this method as compared with that of waiting for the fall of shot before firing the next salvo.

While, therefore, there is no great difference in accuracy in their opening range as compared with ours, they have, undoubtedly, greater chances of first hitting.

We therefore recommend that this form of attack be countered by a "ladder" system of salvoes...[41]

And, on the to be adopted 'ladder system' approach the report continued with:

> On opening fire. Range, deflection, and rate to be calculated as at present, but 2 or 3 salvoes (according to the time of flight) to be fired in rapid succession without waiting to spot fall of shot. Sights to be adjusted as follows:-
>
> 1st salvo: A determined amount below the estimated range.
>
> 2nd salvo: Mean or estimated range.
>
> 3rd salvo: A determined amount above the estimated range.
>
> Should these combined salvoes not cross the target, repeat the ladder until target is crossed...[42]

and the report concluded that:

> As soon as the straddle is obtained deliberate or rapid salvoes should be continued, as at present, until the target is entirely lost, and then we consider that the ladder system is the quickest way of regaining touch.[43]

Still, for the Royal Navy gaining the range was only half of the gunnery conundrum, since Jutland confirmed that there was something wrong with the shells in use by the Grand Fleet. This problem was closely related to the

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[41]'Gunnery Lessons learnt from Action of 31st May' report dated 22 June 1916, Beatty Papers, NMM/BTY/6/17/4.

[42]Ibid.

[43]Ibid.

increased ranges that could be expected in a fleet action involving dreadnought-type ships. In an engagement fought at close quarters, the trajectory of gunfire was nearly flat. As the range of an engagement increased this ceased to be the case, and a shell's angle of descent approached 40^0.[44] Unfortunately, the burster employed in the heavy shells of the Royal Navy was designed to explode on a perpendicular trajectory. Accordingly, as the range of battle increased, the effectiveness of Royal Navy shellfire was limited and shells were liable not to explode.[45] Rumours of this phenomenon reached the fleet, and, Beatty wrote to the Admiralty in August 1916:

> I have the honour to report that in the course of conversation with Dr. Delgren, the Swedish Naval Officer who visited "LION" recently, he informed me that German Naval Officers had mentioned to the Swedish Naval Attaché in Berlin, that during the Battle of Jutland many of our shells struck their ship "sideways" and not point first. My informant was emphatic that these were not ricochets.[46]

Certainly, there had been hints earlier that all was not well. Campbell has noted that the limitations in lyddite heavy shells were known even prior to the war, in particular their ineffectiveness in penetrating heavy

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[44]Invincible letter No.A1/4 to Commander-in-Chief, South Atlantic and South Pacific dated 18 December 1914, Milford Haven Papers, Imperial War Museum, London, IWM/DS/MISC/9.

[45]This writer is struck by the weight and diversity of testimony that concluded that British shells were extremely deadly at the Falklands Islands, Heligoland Bank, and the Dogger Bank, yet deficient at Jutland. One explanation not previously offered may be that the quality of the shells produced during the war was less than the pre-war issue and compounded the basic problem. Thus, as shells were expended, either in battle or during practice shoots, the quality of British shellfire was steadily weakened.

[46]Vice Admiral Battle Cruiser Fleet letter No. 320/B.C.F.05 to Admiralty dated 30 August 1916, Beatty Papers, NMM/BTY/6/8/1.

armour.[47] It must, however, be said that the evidence was at best contradictory. Following the December 1914 Battle of Falkland Islands a summary of the action forwarded to the Admiralty from the battle cruiser HMS Inflexible[48] included the observation that:

> German reports indicate that all shells burst on striking the water, but I am convinced that a certain number did not, since the column of water thrown up, was precisely similar to that caused by practice projectiles, whilst others were as shown.[49]

Others, though, held little reservation regarding the efficacy of British shells. Following the Dogger Bank action of 24 January 1915 between Beatty's Battle Cruiser Fleet and the scouting forces of the High Sea Fleet one British officer noted that, 'Our shells burst with terrific effect whenever they hit...and the lyddite caused furious fires to break out which they did not appear to be able to cope with at all.'[50] This view was shared by Paymaster Hugh Miller who, while in hospital, had the advantage of actually speaking to a captured German naval officer who had been on the receiving end of lyddite-filled shells. In a summary written to the Admiralty, Miller recorded that:

> He says that our Lyddite is terrible and that the Germans have a great respect for it. For some time 2 Officers of his Torpedo Boat during her fight were rendered insensible by the fumes of the 4" Lyddite shell which struck near the bridge.[51]

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[47]Campbell, Jutland, pp. 385-386.

[48]Commissioned 1908; details as per Invincible.

[49]"INFLEXIBLE" report dated 18 December 1914, Phillimore Papers, IWM/66/9/1.

[50]Diary entry dated 26 January 1915, Surgeon Captain G. E. D. Ellis Papers, Imperial War Museum, London, IWM/PP/MCR/197.

[51]'Information Obtained from a German Officer' report dated 27 November 1914 by Paymaster Miller serving in Arethusa, Miller Papers, Imperial War Museum, London, IWM/73/11/2.

Finally, one last observation of British lyddite shells is offered by Captain Charles Wintour who while serving in the flotilla leader HMS Tipperary, was to come to grief at Jutland. Writing early in the war, he recorded:

> I went on board "Liverpool" for a few minutes & heard from Edward Reeves all about the sinking of the "Mainz" & his taking off the prisoners. It must have been a beastly show - they never stood a chance - simply cut to ribbons by our lyddite.[52]

However, after Jutland, and accepting that German capital ships possessed superior armour and internal sub-division, there was no escaping the fact that British heavy projectiles had a latent defect which the Service, at last, took steps to address. In August 1916, at the instigation of Jellicoe, a Projectile Committee was formed to investigate the matter, but it was not until March 1917 that its final report was completed.[53] In the meantime another panel was constituted to examine the problem, and the Shell Committee, as the body was known, established that the deficiency was more severe than originally presumed as the shells in question went beyond just the rounds fired from 12-inch guns.[54] Unfortunately, shells could not be replaced overnight and nearly a year after Jutland the following scene was witnessed aboard HMS Warspite,[55] a battleship of the 5th Battle Squadron:

> The signal had come thru about midnight and thru out the forenoon there were various interpretations and intense excitement. During the previous night all C.A.P. shells

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[52]Diary entry for 1 September 1914, Captain Charles J. Wintour Papers, Imperial War Museum, London, IWM/P447.

[53]Precis of lecture given by Commander H. S. Squance, 'British Naval Strategy, II,' with 'Some Notes on Shell Development after Jutland,' Royal Naval Staff College, Greenwich, 1936 Session, Oliver-Bellasis Papers, NMM/BEL/151.

[54]Ibid.

[55]Commissioned 1915, armed with eight 15-inch guns, and of 27,500 tons displacement.

> had been inspected and many were found to be of bad quality....At an early hour we started disgorging our dud shells bestowing them in an ammunition ship alongside the Port side.[56]

Nonetheless, with the development of a new heavy shell, the Grand Fleet Battle Instructions were amended to reflect that at close range, lyddite remained of value, but that at greater ranges its use was to be forsaken. To wit,

> Ships having 30%, or greater, supply of new A.P.C. (or A.P.C. 'R' or 'X') shell are to use them at the commencement of an action with heavy ships, and continue to do so unless the conditions are manifestly too unfavourable.
>
> Otherwise ships are to use C.P.C. shell at ranges over 12,000 yards. Below this range the old type A.P.C. are the more effective.[57]

The new A.P.C. round corrected the shortcomings cited earlier when a shell struck at an oblique angle; it also introduced a delayed fuse that allowed the shell to penetrate the vitals of a ship before detonating.[58] Certainly, however, the problem persisted to the end of the war, as it was only after the Armistice that sufficient stocks of the new type of shell were made available to all the battleships.[59]

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[56]Midshipman Journal entries dated 29-30 April 1917, Commander H. C. Burton Papers, Imperial War Museum, IWM/81/13/1. If Burton's entry is correct, C.A.P. was the code used to describe chemical shells filled with chloroacetophenone, a non-lethal lachrymatory agent. See ADM 186/82, 'C.B. 3021, Handbook of Chemical Warfare, 1931,' Admiralty, Torpedo and Mining Department dated September 1931, pp. 16 and 40. Alternatively, Burton may have meant to describe A.P.C. filled shells.

[57]'Grand Fleet Battle Instructions' dated 1 January 1918, as amended, Beatty Papers, NMM/BTY/7/4/1, p. 29. C.P.C. is the abbreviation for Capped Pierced Common.

[58]ADM 1/8656/25, Director of Naval Ordnance minute dated November 1924.

[59]'Some Notes on Shell Development after Jutland,' Oliver-Bellasis Papers, NMM/BEL/151.

Nevertheless, gunnery involved more than the fire of disjointed ships; it was about making the whole greater than the sum of its parts, and the concentration and proper distribution of the fleet's firepower was the linchpin of fleet tactics. Jutland demonstrated that numerical superiority and heavier broadsides could not by themselves guarantee victory if the powerful synergy of command and control and squadron concentration were missing. This was most acutely highlighted during the initial phase of the action when the Fifth Battle Squadron was not concentrated with the rest of the Battle Cruiser Fleet. Still, so marked was the Royal Navy's potential firepower superiority during the period typically known as the 'Run to the South' that this shortcoming could have been mitigated had the distribution of fire by the First and Second Battle Cruiser Squadrons against the First Scouting Group ensured the engagement of all German capital ships.[60]

The above conclusion is certainly at variance with the apparent lesson that some officers of the Royal Navy drew from the engagement, which may only prove that not every lesson learned is the correct one. One officer's analysis included the observation that:

> It will be noted that fire concentration forms an essential feature of our battle plan, for we require to concentrate the fire of our whole fleet on a part of the enemy's line. This has been the recognised key to victory for more than 100 years, but it is submitted that Section XV of the Grand Fleet Battle Orders contains certain expressions of opinion on this subject which directly violate the above principle. In particular, the law "fire at your opposite number" will create a strong tendency to select a more distant target, because she is the "opposite number", and

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[60]The First Battle Cruiser Squadron included HMS Tiger, HMS Princess Royal, Lion, and Queen Mary; the Second Battle Cruiser Squadron comprised HMS New Zealand and Indefatigable. The First Scouting Group was composed of five battle cruisers. Collectively, the British ships mounted 32 13.5-inch and 16 12-inch guns; German ships totaled 16 12-inch and 28 11-inch guns.

> thereby to neglect priceless opportunities for concentrated fire on a nearer target.[61]

Drax's[62] view failed to address the fundamental flaw of the battle cruiser--namely its sacrifice of armoured protection--and the place of the battle cruiser in the line of battle forms one aspect of the capital ship controversy. Nevertheless, given its role in the line of battle during the 1914-1918 war, it was essential that British battle cruisers when engaging their counterparts ensured that each ship came under fire, if only to disrupt the effectiveness of the German shooting. The tendency for the accuracy of German fire to diminish once British ships found the range was understood in the gunrooms and the wardrooms of the Grand Fleet. This effect was increased when the greatest rate of fire was produced by British heavy ships.[63] Gilbert Bickmore, an Assistant Paymaster Clerk, whose action station at Jutland was in 'A' Turret of Warspite observed that 'the German shooting was at first much more accurate than ours for they had better range-finders. But, as always happened, once our shells began to hit, the German accuracy tailed off.'[64]

One issue that proved difficult to resolve even in the light of war experience was the ideal range to be aimed at

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[61]Drax letter to Beatty dated 9 August 1917, Beatty Papers, NMM/BTY/7/2/12. Original emphasis.

[62]Admiral Sir Reginald Aylmer Ranfurly Plunkett-Ernle-Erle-Drax (1880-1967). First Director Royal Naval Staff College, Greenwich (1919-1922); Commander, First Battle Squadron (1929); Commander-in-Chief, America and West Indies (1932-1934); Commander-in-Chief, The Nore (1939-1941); retired (1941); recalled to active duty and commodore of convoys (1943-1945).

[63]ADM 186/615, 'C.B. 925, Grand Fleet Gunnery and Torpedo Memoranda on Naval Actions, 1914-1918,' Admiralty, Naval Staff, Gunnery Division dated April 1922, pp. 4 and 8.

[64]Personal memoirs of Dr. Gilbert H. Bickmore, Bickmore Papers, Imperial War Museum, London, IWM/85/26/1, p. 16.

in a fleet action. Tied as it was to an estimate of the capabilities of the enemy's fleet and its likely tactics, it was not an issue easily reconciled. The divergence of views is exemplified by the conflicting recommendations reached following the Dogger Bank engagement. Thus, Beatty noted:

> 'The Falkland Islands fight and the 24th January have proved that hits can be made without difficulty at 19000 or 20000 yards, but this range is not decisive and the percentage of hits is too small. An hour's fighting may find guns disabled and ammunition running short without a decisive result being obtained. Therefore there is no harm in slow firing at long range, but we must try to get in closer without delay. Probably 12000 to 14000 yards would suit us well, this being outside the effective range of the enemy's torpedo and 6" guns. We must try to combine early hits with decisive hitting soon afterwards.[65]

An opinion that Chatfield, Beatty's Flag Captain, took exception with when he observed that:

> it appears that any range under 22000 yards hitting can be attained within a few minutes. The mistake made was in not at once going into rapid independent and putting forth our whole volume of fire regardless of ammunition expenditure. The enemy would then have been overwhelmed and would never have recovered.[66]

Moreover, it was after Jutland that the Service began to refine its gunnery tactics by concentrating the fire of multiple ships upon a single target. To this end, Admiral

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[65]'NOTES ON THE ACTION OF THE 24TH JANUARY 1915. BY :- THE V.A. COMMANDING THE BATTLE CRUISER FLEET. H.M.S."LION".,' Milford Haven Papers, IWM/DS/MISC/9. Original emphasis.

[66]'REMARKS ON THE ACTION OF THE 24TH JANUARY 1915. BY :- THE CAPTAIN. H.M.S."LION".,' Milford Haven Papers, IWM/DS/MISC/9. Original emphasis.

Sir Charles Madden,[67] wrote to Jellicoe, his brother-in-law, now serving as First Sea Lord:

> Much gunnery activity in the Committee line & rather full ideas in the air, but I think we can steady them down one is to concentrate 4 ships on one ship plotting and spotting for four & directing them by a Seaplane Wireless set.[68]

As a tactical precept, the idea of concentrating the fires of multiple ships had long been recognized, and the benefit of one ship providing spotting assistance to another was noted at the time of the Dogger Bank action. In an after action report, it was observed:

> At the beginning of the action "TIGER'S" fire was observed to be going considerably over and she was evidently materially assisted in correcting this by a signal made from "SOUTHAMPTON". It would appear that under similar conditions in the future, spotting might be effectually carried out by the system of inter-squadron communication.[69]

Turning to the use made of the torpedo by British capital ships at Jutland, it must be remarked that its promise remained unfulfilled. Campbell records that only 13 torpedoes were fired during the daylight action by the battleships and battle cruisers of the Grand Fleet, and none at all were expended by capital ships during the night of 31 May - 1 June 1916.[70] In turn, only one British heavy

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[67]Admiral of the Fleet Sir Charles E. Madden (1862-1935). Chief of Staff to Commander-in-Chief Grand, Fleet (1914-1916); Deputy Commander-in-Chief, Grand Fleet (1917-1919) Commander-in-Chief, Atlantic Fleet (1919-1922); and First Sea Lord (1927-1930).

[68]Madden to Jellicoe letter dated 3 January 1917, Jellicoe Papers, Additional MSS 49,009.

[69]'REMARKS ON THE ACTION OF 24TH JANUARY 1915. BY :- THE CAPTAIN. HMS "NOTTINGHAM",' Milford Haven Papers, IWM/DS/MISC/9.

[70]Campbell, Jutland, pp. 400-404.

ship, HMS Marlborough[71] sustained damage by enemy torpedo fire.[72] Grove notes that at Jutland British capital ships had no less than 364 such weapons.[73] The question of whether capital ships should continue to maintain a torpedo armament capability given its cost in manpower, its perceived weakening of a ship's armoured protection, and its limited tactical utility would be addressed during the interwar period.

Night-Fighting. During the Jutland action Jellicoe made the decision as the daylight hours waned to shift the Grand Fleet into night cruising formation with the thought of continuing the action on the dawn of 1 June 1916. One writer has said that 'British night-fighting technique was very inferior to the German, and indeed virtually non-existent.'[74] While it is true that German night-fighting skills were superior, it is wrong to claim that the Royal Navy was not trained in this aspect of naval warfare. That this was so is best typified by the initial desire of Rear Admiral Troubridge[75] to engage the German battle cruiser SMS Goeben in a night action in August 1914. At sea, British heavy ships routinely operated at Night Defence Stations, if not to seek battle with the enemy, then at least to be in a better tactical disposition to meet any potential attack, and evidence exists that pre-war training in night-fighting was more common than previously thought. For

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[71]Commissioned 1914, armed with ten 13.5-inch guns, and of 25,000 tons displacement.

[72]Precis of lecture 'Jutland', Royal Naval Staff College, Greenwich, Session 1927-1928, Admiral Sir William George Tennant Papers, National Maritime Museum, Greenwich, NMM/TEN/41/5.

[73]Eric Grove, Fleet to Fleet Encounters: Tsushima, Jutland, Philippine Sea (London: Arms and Armour, 1991), p. 76.

[74]Campbell, Jutland, p. 257.

[75]Admiral Sir Ernest Charles Thomas Troubridge (1862-1926). Commander, First Cruiser Squadron (1912-1914); Senior Naval Officer, Danube (1918); and retired (1921).

example, Vice Admiral Brian Schofield's midshipman journal is replete with night time tactical exercises conducted by the battle cruiser HMS Indomitable[76] and other capital ships during the 1913-1915 period. These evolutions included practice firing of the 12-inch guns of Indomitable and the 13.5-inch batteries of her consorts, the exercise of secondary armament, and countering torpedo attack by destroyers. These progressions confirmed the extreme difficulty of co-ordinating the searchlights used for directing fire and the risks that destroyers posed.[77] Jellicoe's decision to defer battle was therefore founded upon the understanding that the capital ship's offensive attributes were lessened at night while darkness maximized the advantage of the smaller silhouette enjoyed by flotilla forces. At Jutland, that the Grand Fleet was athwart the High Sea Fleet and its bases added impetus to the decision to seek to renew the battle on the following morning. Unfortunately for Jellicoe, Scheer was determined to reach the Jade and forced the High Sea Fleet through the British cruising formation. During the night, numerous encounters of a disjointed nature occurred between the two fleets--encounters that went unreported to Jellicoe. Consequently, Jellicoe was forestalled in his attempt to continue the engagement. Still, if Jellicoe's decision was tactically sound, it came to be recognised that chances for battle must be taken as they come and not as they are desired, and the Service during the interwar period was to work hard at developing its night-fighting skills.

In the immediate aftermath of Jutland it was recognised that a reliance on searchlights for night time battle drill was not enough, and the Royal Navy worked to develop an effective star shell--a shell, it should be

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[76]Commissioned 1908; details as per Invincible.

[77]See Midshipman Journal of Brian B. Schofield, especially entries 2-3 June 1913, 13-14 April 1914, 15 and 19 June 1914, and 7 April 1915. Vice Admiral Brian B. Schofield Papers, Imperial War Museum, London, IWM/P.72.

noted, very much in the arsenal of the High Sea Fleet. The danger of poorly worked searchlights was documented and one report observed that:

> If searchlights must be used, then in one position only; the use of two searchlights widely separated gives away the position of the ship and her alterations of course....As searchlights form a focus for enemy fire, those on the Bridge should not be used if it can be avoided.[78]

In time, star shells would make their way to the fleet, and the Grand Fleet Battle Instructions were revised to reflect this fact. Still, they were considered of secondary importance, and the searchlight continued to be the preferred means of illumination for the remainder of the war. Hence, the following principle prevailed:

> When it is decided to engage the enemy ships, the searchlight is to be considered the primary means of illuminating them. Star shell are to be kept ready for firing but, generally, are only to be used for :--
> (a) Examining a suspected area.
> (b) Assisting gunfire when searchlights cannot be used.[79]

Notwithstanding the dangers of poorly operated searchlights, the star shell too had its limitations, so that:

> Against an alert enemy it is unsafe to use star shell as a primary means of illumination. If, as may be expected, he switches on his searchlights simultaneously or in reply, the star shell effect is nullified.[80]

The drawbacks of relying solely on searchlights became obvious after Jutland, but the question of why the British had not developed the star shell previously when it knew

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[78]'Gunnery Lessons learnt from Action of 31st May' report dated 22 June 1916, Beatty Papers, NMM/BTY/6/17/4.

[79]'Grand Fleet Battle Instructions' dated January 1918, Beatty Papers, NMM/BTY/7/4/1, p. 21.

[80]Ibid.

that the High Sea Fleet had such a capability remains. Probably the most satisfactory answer is that with its emphasis on firepower in warship design and on offensive action in its operational doctrine, the Service viewed the star shell, even when employed in a ship's secondary armament, as a weakening of a unit's offensive potential.

Identification. Closely associated with the issue of searchlight and star shell employment and night time battle was the matter of identification. Merely sighting a warship is not enough to determine whether to engage or to flee. At some point, and preferably, from tactical considerations, the earlier the better, a determination has to be arrived at as to whether the vessel is hostile or friendly. In naval action, the issue of identification is compounded by the acceptance that a legitimate ruse of war is for a ship to fly false colours.[81] Prior to the 1914-1918 war, the Royal Navy had worked out a basic means of determining warship identification. At the start of hostilities, recognition signals consisted of the 'British Private Disk' and a 'Challenge and Reply' documented in the Allied Fleet Signal Book, while British torpedo craft had a unique set of identification lights.[82] However, as the war progressed it proved necessary to develop a broader range of identifying signals and marks in order to control merchant shipping and convoys and to recognise aircraft and submarines as friendly or hostile. By the end of the war, therefore, the British had developed an extensive range of procedures and means to foster proper unit identification including the 'British Private Signal,' Very Brock Signals, and unique lettering applied to ships of the Grand Fleet to allow proper recognition by aircraft. It must be added that the sophistication of these means increased as the war progressed. The first steps taken were rudimentary at best

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[81]Ingrid Detter De Lupis, The Law of War (Cambridge: Cambridge University Press, 1987), pp. 259-262.

[82]ADM 1/8558/135, 'Identifications and Recognition Signals,' dated 9 May 1919.

and stemmed from the consideration that, from afar, the German naval ensign and the White Ensign of the Royal Navy could be confused.[83] Thus, in the first month of war the order was made that:

> Ships are to hoist Blue ensign as well as White when going into action or approaching any suspicious vessel, to distinguish our ships from German. Ships with two masts are to fly the Blue ensign at the main.[84]

This was quickly superseded by new instructions that the Blue Ensign was to be replaced by the Union Flag to be flown from the fore stay which, in turn, were followed by instructions on the flying of the Red Ensign.[85] Large white lettering, unique for individual ships, was also applied to the turrets of capital ships to aid in ship recognition.[86] These measures were a quick fix to a critical problem, and, in time, the disk with its multiple settings proved a better solution. It was recognised that the means employed could not remain static lest the enemy copy them and employ them as a ruse. Thus, settings were defined via Key memorandum and issued to ships with procedures defined for supersession in the event of a compromise.[87] Moreover, as naval operations were from the very beginning a coalition affair, some procedures had to be shared with allies and associates.[88] This complicated the issue of identification,

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[83]Admiralty Order of 16 November 1914, Jellicoe Papers, Additional MSS 49,005.

[84]Diary entry dated 1 September 1914, Ellis Papers, IWM/PP/MCR/197.

[85]Ibid., entries dated 4 September and 15 November 1914.

[86]Ibid., entry dated 28 September 1914.

[87]ADM 1/8558/135, 'Identification and Recognition Signals,' dated 9 May 1919.

[88]While the United States fought as an associated power, its unique operational role with the Grand Fleet where its capital ships formed the Sixth Battle Squadron,

but by war's end a problem that rarely featured in the writings of prewar theorists had been embraced, investigated, and, if not resolved, at least adequately addressed given the technology of the day. In the confused action at Jutland, the question of identifying friend from foe was to have deadly consequences, particularly during the encounters at night. A postwar assessment of the battle by the Navy included the following incident observed by the Commodore, 11th Destroyer Flotilla:

> I must mention that about 2100 a ship at the head of the 2nd squadron made the following signal by searchlight: "Please give me the challenge and reply for the day as I have lost mine. I did not see the reply made but evidently the signal was made by one of our ships and the Captain of the MANNERS told me he saw the reply made. It is possible that the question had been asked by one of the enemy vessels"...[89]

Prior to Jutland, the High Sea Fleet had gained knowledge of the British identification procedures in general, and during the battle the specific 'Challenge and Reply' in use.[90]

During the war, a prime consideration was to minimise the risk of what has become known as 'friendly fire' or a 'Blue on Blue' engagement. To this end, a premium was placed on the safety of British forces, and the Grand Fleet Battle Instructions required that:

> The challenge procedure must be carried out before fire is opened and it must be borne in mind that vessels already in action may fail to reply to the V.B.S. and may have

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allowed access to Royal Navy procedures denied any other ally. This was particularly true in the realm of identification and caused much concern in the initial postwar period.

[89]NID P256/24, pp. 120-121, Beatty Papers, NMM/BTY/9/10. HMS Manners was a unit of the 11th Destroyer Flotilla commanded by Lieutenant Commander G. C. Harrison; the Commodore commanding the 11th Destroyer Flotilla was J. R. P. Hawksley.

[90]Campbell, Jutland, pp. 277-278.

> had their fighting lights shot away.
>
> No item of recognition by appearance or pendants painted on the bow must be overlooked and under such circumstances fire should only be opened by the supporting vessels on a certain enemy.[91]

The evolution of the Royal Navy's doctrine on identification was to undergo much change in the period following the Armistice, and this will be addressed in due course. For the present, let it be said that the effectiveness of battlefleet tactics would not be sacrificed on the altar of safety during the 1919-1939 period.

Scouting and Reconnaissance. The Grand Fleet's tactical disposition for battle against the High Sea Fleet was markedly different than its normal cruising disposition. The former emphasised the development of the greatest firepower on a given course during battle; the latter was meant to minimise the risk of submarine attack, maintain fleet cohesion, facilitate unit station keeping, and allow a quick deployment on the appropriate bearing relative to the enemy's course.[92] A consequence of the Grand Fleet having a distinct battle formation was that the Fleet Commander required timely intelligence on the enemy's disposition in order to develop the maximum rate of fire of the British gun line upon engaging the High Sea Fleet. The information required could be gleaned by signals intelligence or by the fleet's scouting and reconnaissance forces. At best, the signals intelligence provided by the Admiralty could only indicate that the High Sea Fleet was at sea, provide an estimate of its numbers, its possible course of action, and a general indication of its course

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[91]'Grand Fleet Battle Instructions' dated 1 January 1918, Beatty Papers, NMM/BTY/7/4/1. V.B.S. refers to Very Brock Signal.

[92]Hughes, Fleet Tactics, pp. 70-72.

and location.[93] Perforce, the tactical value of such information diminished with time. And time, indeed, it took to intercept, decode, evaluate, and disseminate the intelligence, if warranted, to the Commander-in-Chief, Grand Fleet.[94] On this point, Jellicoe himself addressed the limitations of Admiralty signals intelligence:

> It should be realised that implicit reliance could not be placed on "Intercepts". I could not assume, for instance, that because the High Sea Fleet steered a course S.S.E¾E. at some time between 9 and 10 p.m. that this course would be maintained until I received information from the Admiralty to the contrary. I could not expect that any but a small proportion of Scheer's signals would be intercepted.[95]

Likewise, the tactical signals intelligence provided by HMS St. Vincent,[96] HMS Canada,[97] and Indomitable[98] at Jutland

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[93]While generally known, little has been written about signals intelligence and the naval war during the 1914-1918 period. What has been written discusses the strategic capabilities of the Admiralty; see Patrick Beesly, Room 40: British Naval Intelligence 1914-18 (New York: Harcourt, Brace, Jovanovich, 1982). Virtually nothing has been written on the tactical signals intelligence capabilities of the Grand Fleet.

[94]James Goldrick, The King's Ships Were at Sea: The War in the North Sea August 1914-February 1915 (Annapolis: Naval Institute Press, 1984), p. 209.

[95]'Jutland, Remarks on Narrative,' Jellicoe Papers, Additional MSS 49,027, pp. 41-42.

[96]Commissioned 1910, armed with ten 12-inch guns, and of 22,000 tons displacement.

[97]Commissioned 1915, armed with ten 14-inch guns, and of 32,000 tons displacement.

[98]ADM 186/625, 'S.P. 02085, Battle of Jutland, Record of Messages Bearing on the Operation,' Admiralty, Naval Staff, Communications Division dated 23 September 1919 reproduces the British signals associated with the engagement. Tactical intercepts of High Sea Fleet wireless communications were passed to Jellicoe via semaphore or searchlight by St. Vincent, Indomitable, and Canada in order not to alert the Germans that their signals had been compromised.

could do little more than indicate which ships or commanders were at sea based on their call signs, the type of units present based on the wavelength of the transmission, the relative urgency of the signal,[99] and the transmitting ship's approximate distance based on the strength of the signal.[100] Given the vagaries in reception due to signal propagation and the difficulty of estimating the bearing of the signal's origin, such information could provide little more than an indication and warning of an impending action and was of limited value to the Fleet Commander in reaching a decision regarding battlefleet deployment.[101] Writing after the fact, Jellicoe stressed that he valued the scouting information provided by a ship in direct observation of the enemy over the signals intelligence of the Admiralty.[102] Given the limitations in signals intelligence previously cited, one can accept the Admiral at his word, and yet British scouting and reconnaissance were not without fault at Jutland. Many scouting units failed to provide enemy sighting reports or provided reports of questionable value due to errors that arose when the reporting ship estimated its own position by means of dead reckoning relative to the enemy's location. Moreover, the need to provide reconnaissance reports after the battle had been broken off, or during periods of

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[99]Goldrick, King's Ships, p. 222.

[100]ADM 186/625, 'S.P. 02085.'

[101]Section XXI, Grand Fleet Wireless Telegraphy Orders of 10 March 1915, in ADM 116/1663 specify the procedures to be followed for ships monitoring enemy tactical wireless communications. A review of the Grand Fleet ships providing such information to Jellicoe shows that it was the last ship of a division that was usually detailed to perform such work. The reason can be attributed to electromagnetic interference caused by gun fire and using the rearmost ship minimised this phenomenon. See G. H. Collman Williams, 'Notes on Fleet Tactics,' Naval Review, Volume VIII, 1920, p. 51.

[102]'Jutland, Remarks on Narrative', Jellicoe Papers, Additional MSS 49,027, p. 15.

limited visibility, had not been appreciated by the scouting forces.[103] Beatty, for one, came to appreciate the need for tactical reconnaissance and scouting after Jutland and modified the standing orders of the Battle Cruiser Fleet to read:

> "It becomes the duty of subordinate leaders to act in the spirit of the Commander-in-Chief's requirements. These are only two and they are very simple. So long as the enemy ships remain afloat we must locate and report, attack and destroy: but to perform either duty without the other is to fall short of that co-ordination which ensures success, nor should it be thought that to perform one duty effectively it is necessary to abstain from the other."[104]

The problems in scouting and reconnaissance and poor reporting procedures were certainly not limited to the fleet's flotilla forces, and neither the Fifth Battle Squadron nor the Third Battle Cruiser Squadron made contact reports to the Commander-in-Chief during the battle.[105] These failings were recognised, and during the interwar period the Service would pursue changes in reporting procedures in an effort to enhance the accuracy of tactical scouting and reconnaissance. Finally, the scouting and reconnaissance forces available to the British at Jutland were principally those of the flotillas. There was a hint of aerial reconnaissance when HMS Engadine[106] launched one

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[103]'Summing Up by Director, Royal Naval Staff College on Jutland Lectures 1927,' Peachey Papers, NMM/PCY/1.

[104]'Jutland V' lecture, Appendix to Synopsis, Royal Naval Staff College, Greenwich, Session 1931-1932, Tennant Papers, NMM/TEN/41/3. Original emphasis.

[105]Precis of 'Jutland' lecture delivered December, 1938 by Captain H. J. Egerton to Senior Officers' School, Sheerness, Tennant Papers, NMM/TEN/41/5.

[106]Merchant vessel converted into a seaplane carrier; commissioned August 1914, rebuilt in 1915, and of 2400 tons displacement. See Norman Friedman, British Carrier Aviation: The Evolution of the Ships and their Aircraft (Annapolis: Naval Institute Press, 1988), pp. 364-366.

of her Short aircraft. The sortie of Flight Lieutenant F.J. Rutland and his observer, Assistant Paymaster G.S. Trewin, was aborted prematurely when the engine failed,[107] and Engadine was unable to relay via searchlight the limited information secured to another ship.[108] The reconnaissance was hindered by low cloud cover, and Rutland recalled that:

> On sighting the enemy it was very hard to tell what they were, and so I had to close to within a mile and a half at a height of 1,000 feet. They then opened fire on me with anti-aircraft and other guns, my height enabling them to use their anti-torpedo armament.[109]

The problems in passing such information reflect the shortcomings of naval command and control during the 1914-1918 war, and it is this issue that will now be considered.

Command and Control.[110] Fleet doctrine during the 1914-1918 war was promulgated via a series of standing orders, instructions, and memoranda. They covered a myriad of issues that were central to ensuring that the Grand Fleet operated as an integrated force. The 'Grand Fleet Battle Orders' and their successor, the 'Grand Fleet Battle Instructions' were more than just a tactical handbook to support fleet operations.[111] In a very real sense, they

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[107]V. E. Tarrant, Jutland: The German Perspective (London: Arms and Armour Press, 1995), p. 71.

[108]Halpern, Naval History of World War I, p. 317.

[109]H. W. Fawcett and G. W. W. Hooper, The Fighting at Jutland: The Personal Experiences of Sixty Officers and Men of the British Fleet (Glasgow: Maclure, MacDonald & Co., 1921), p. 13.

[110]It is not possible to discuss adequately the issue of naval command and control. The best one volume source is Andrew Gordon, The Rules of the Game: Jutland and British Naval Command (London: John Murray, 1996).

[111]Beatty replaced the 'Grand Fleet Battle Orders' with the 'Grand Fleet Battle Instructions' and 'Grand Fleet Manoeuvering Orders' in January 1918. See Gordon, Rules of the Game, pp. 527-529 and ADM 186/596, 'Introduction to

provided the Commander's estimate of the situation, defined a priori the type of battle to be fought against the High Sea Fleet, and provided for its rules of engagement. Given the Grand Fleet's performance at Jutland, much criticism, contemporary and subsequent, has been directed against the orders and instructions. A common complaint has been that they all too frequently stifled the initiative of ships' captains. In this criticism there is some truth. Yet, frequently overlooked by commentators is that given the technical limitations in signalling during the 1914-1918 war and the expanded area over which a potential fleet engagement would take place, standing doctrine had perforce to play a greater role if a fleet commander were to retain any control over the battle once the action became general.[112] Further, a common tactical picture of an engagement such as Jutland did not exist between Jellicoe, the Fleet Commander, his subordinate flag officers, and the captains of individual ships. Moreover, the initiative open to a ship's commanding officer is dependent on the scale of the engagement; the scope for individual initiative in a combat between two ships is infinitely greater than in an engagement between opposing fleets, or for that matter even squadrons. In an engagement between single ships the aim of the tactical commander and the aim of ship's captain are one; this cannot be said about a fleet engagement.[113] In the light of wartime experience the

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Grand Fleet Battle Orders'. A separate set of standing orders, 'Grand Fleet Wireless Telegraphy Orders', covered fleet communication procedures whilst general fleet procedures were specified in 'Grand Fleet Orders'.

[112]Brodie, Sea Power in the Machine Age, p. 248 and Hughes, Fleet Tactics, pp. 79-81 touch upon aspects of this issue.

[113]Pre-1914 Royal Navy doctrine recognised that the size of the fleet must influence the tactics adopted. Devolvement of control to column commanders was specified in memorandum H.F. 03, a supplement to Admiralty Instruction M. O. 426/13/A of October 1913. See Thursfield Papers, NMM/THU/107.

benefits of decentralised command were certainly acknowledged in the revised Grand Fleet Battle Instructions but only to a point. Given its penetration of German naval wireless communications and the limited dissemination of such intelligence, the instructions still recognised that the Fleet Commander remained the final arbiter of command. Thus,

> Notwithstanding the decentralisation of command indicated above, the Commander-in-Chief will retain the power to order the movement of the whole fleet by a general signal. Such a movement may be necessary owing to information known only to him and in order to ensure decisive results.[114]

Beyond the published orders, control of the fleet during the 1914-1918 war was exercised by semaphore, searchlight, wireless, and flag hoist. Each had their benefit, and, as important, their limitation. This was particularly true at night or during periods of limited visibility when visual means of signalling were employed. Communications by wireless possessed a unique set of problems. Mutual interference arose when ships attempted to transmit their signals simultaneously--one estimate is that at Jutland 65 ships were operating on the fleet's general wavelength, and the effective range could be extremely short.[115] Consequently, traffic discipline became essential as ships shared common waves or frequencies. Still, common to both flag hoist and wireless communications was that once battle damage was sustained maintaining communications became difficult, if not impossible, as halyards and aerials were lost. Both Lion, Beatty's flagship, and HMS Barham,[116] the flagship of the Fifth Battle Squadron temporarily attached

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[114]'Grand Fleet Battle Instructions,' dated 1 January 1918, Beatty Papers, NMM/BTY/7/4/1, p.2.

[115]Group Captain Arthur John Brister Papers, Imperial War Museum, London, IWM/MISC/1010/65/1. During the 1914-1918 war Brister served as a Telegraphist in HMS Iron Duke.

[116]Commissioned 1915; details as per Warspite.

to the Battle Cruiser Fleet, suffered damage at Jutland that destroyed their wireless facilities.[117] Thus, the scouting and reconnaissance intelligence cited earlier which was so important to the Fleet Commander was itself dependent on a constrained command and control system. Within the Grand Fleet, these limitations were recognised and light cruisers were used to relay the flag signals of the Fleet Commander to the rest of the fleet.[118]

Capital Ship Protection. With the loss of three battle cruisers in a day, Jutland pointed to the particular vulnerability of that type of heavy ship for the Royal Navy. Writing soon after the event in a private letter to Arthur Pollen,[119] Jellicoe confided:

> Our battle-cruisers showed their terribly weak point of want of protection as compared with the German. The public should know how poorly they compare in this respect.[120]

Yet, if Jutland demonstrated which side in the prewar debate between speed or protection in warship design was correct, there were practical limits in immediately assimilating the lesson. The Grand Fleet's losses had to be made good, and the Germans were continuing with their own battle cruiser building programme.[121] Jellicoe forwarded

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[117]Arthur Hezlet, The Electron and Sea Power (London: Peter Davies, 1975), p. 126.

[118]Geoffrey Bennett, The Battle of Jutland (London: B. T. Batsford, Ltd., 1964), p. 70.

[119]Arthur Joseph Hungerford Pollen (1866-1937). Civilian naval writer and inventor.

[120]John B. Hattendorf, et al., eds., British Naval Documents 1204-1960 (Aldershot: Scolar Press, 1993), p. 830.

[121]In an immediate attempt to alleviate the deficiency in battle cruisers Jellicoe recommended that the Japanese be approached with an eye towards selling two such ships to the British. Jellicoe to Geddes memorandum dated 21 July 1917, Temple Patterson, ed., Jellicoe Papers, Volume II, p. 185.

to the Admiralty a recommendation that the armour distribution for a proposed new class of battle cruisers be examined by the Director of Naval Construction in light of the experience of Jutland.[122] Ironically, given their identified weaknesses, the only British capital ships under construction by war's end were battle cruisers.[123]

Campbell has concluded that the specific reason why Invincible came to grief at Jutland was the flash of cordite charges from the turret to the magazine.[124] Gordon has noted that in the aftermath of the battle, detailed instructions were issued to improve the anti-flash measures in the handling of cordite.[125] Thus, the protection of capital ships was closely tied to both structural and procedural deficiencies. Immediately following Jutland, the problems of ammunition handling and magazine safety were accepted and the need to develop defensive tactics to avoid being hit endorsed.[126]

Manoeuvre. The aim of manoeuvre in fleet tactics was to maximise the collective firepower in combat and provide the greatest degree of protection and safekeeping whilst cruising. Given the size of the Grand Fleet and its importance in developing fleet fires, it can be argued that manoeuvre was perhaps the greatest tactical issue--

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[122]Jellicoe to Admiralty letter dated 29 June 1916 cited in Temple Patterson, ed., Jellicoe Papers, Volume II, p. 21.

[123]The ships were HMS Anson, HMS Howe, HMS Rodney, and HMS Hood, of which, only Hood was completed. See Deputy Chief of Naval Staff memorandum D.W.P. 3852 dated 22 December 1918, Admiral Sir Sydney Robert Fremantle Papers, National Maritime Museum, Greenwich, NMM/FRE/312/925; ADM 1/8564/210 discusses the relative weakness of the Royal Navy battle cruiser force to its German counterpart.

[124]Campbell, Jutland, p. 169.

[125]Gordon, Rules of the Game, p. 505.

[126]'Gunnery Lessons learnt from Action of 31st May,' report dated 22 June 1916, Lion, Beatty Papers, NMM/BTY/6/17/4.

exceeding even gunnery. Indeed, a ship manoeuvred poorly could negate the gunnery effectiveness of the fleet, as the example of HMS Orion[127] at Jutland showed. Recalling his service as a midshipman in Erin,[128] Norman Lockhead noted:

> I regret to say that my ship was unable to fire, as during the short time the enemy was in sight, the Orion who was next to us in line, had failed to take station astern of us and was lying between us and the enemy.[129]

The very size of the Grand Fleet and the limited means of command and control available made its wielding as an integrated force extremely difficult. This dilemma led to a realisation that a decision in a fleet engagement might be more attainable by ceding the initiative to the separate squadrons of the Grand Fleet. It was with this in mind that Drax wrote to Beatty:

> The chief question arising from this plan of battle is, whether it might not be better executed by the method of attack known as "divided squadrons", i.e. squadrons widely separated, which simultaneously close in on the enemy's fleet and surround it.[130]

Still, the twin aims of manoeuvre could at times conflict. Never more was this the case than when the fleet faced a concerted torpedo attack. Following its deployment for action, the Grand Fleet could be disposed in a linear

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[127]Commissioned 1912, armed with ten 13.5-inch guns, and of 25,500 tons displacement.

[128]Commissioned 1914, armed with ten 13.5-inch guns, and of 26,000 tons displacement.

[129]'Recollections of the Battle of Jutland,' Lieutenant Commander Norman McClean Lockhead Papers, Imperial War Museum, London, IWM/MISC/1010/65/2.

[130]Drax letter to Beatty dated 9 August 1917, Beatty Papers, NMM/BTY/7/2/12.

formation that exceeded twenty miles in length.[131] Though such a formation maximised the power of the fleet's gunline, it came at the price of offering the broadest target for a torpedo attack. Whilst screening forces accompanied the Grand Fleet to minimise the danger, they could never totally negate such a threat. Thus, once a torpedo attack was launched, the options for countering devolved to: turning the fleet away from the axis of attack, turning the fleet towards the axis of attack, allowing ships the freedom of independent manoeuvre, or maintaining course and speed and riding out the strike.

During the Great War, the 'turn away' of the battlefleet was the conventional means of negating torpedo attack. Still, if the 'turn away' was the accepted tactical palliative, Jellicoe received much criticism for executing the manoeuvre at Jutland. While the increase in range provided by a 'turn away' minimised the effectiveness of the enemy's torpedo attack, it took the Grand Fleet's guns away from its primary target--the heavy ships of the High Sea Fleet. By 1918, the Grand Fleet was willing to accept the torpedo risk, if in action with the High Sea Fleet. As a result, the Grand Fleet Battle Instructions were modified to read:

> it is the intention of the Commander-in-Chief to keep outside the line 15,000 yards from the enemy's course measured along the normal. If, however, this procedure would entail the loss of gunfire, the torpedo menace will be accepted, and the fleet turned towards the retiring enemy.[132]

Summary. On balance, the Royal Navy's performance in the 1914-1918 war, while of mixed results, proved more than satisfactory and allowed the Entente Powers to prevail. If

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[131]'Grand Fleet Manoeuvring Orders, Appendix 2, Diagram Showing the Order of the Fleet After Deployment,' Beatty Papers, NMM/BTY/7/3/3.

[132]'Grand Fleet Battle Instructions,' dated 1 January 1918, Beatty Papers, NMM/BTY/7/4/1, p. 2.

it could not materially alter the German position vis-à-vis Russia, it ultimately ensured, through its maintenance of the sea lines of communication to the New World, that the entry of the United States would. The war that transpired was certainly not the war the Service anticipated. A latent submarine threat that was largely ignored prior to the war, had come within an ace of neutralizing the Royal Navy's traditional control of the seas. Moreover, the capital ship, the presumed essence of the Service's strength, was shown to be seriously flawed. Nevertheless, the Royal Navy prevailed and that it did so was a testament to its officers and men, the advantage of geography, and the vital importance of numbers. A navy bred on a tradition of ultimate victory, it absorbed its setbacks with a stoicism and a grim determination to prevail. It had misjudged the underwater threat, and the war had ended before the promise of the aeroplane could meet the vision of some of its prophets. The Royal Navy was determined that its next fleet action would be Trafalgar writ anew; the intervening period would be spent on rectifying the operational and tactical deficiencies identified by the test of war, and at the centre of this was the capital ship. Would the Navy prove more successful in dealing with the threat from the air than it had with the danger from below, and, indeed, had the sub-surface danger yet been mastered? Time could only tell.

Yet, the Royal Navy was not necessarily master of its own house. The sharp end of British foreign policy, perhaps, but it was also an agency of government--and, a very costly agency at that. Others, including the Treasury and the Foreign Office, would define the environment in which the interwar Service operated. It is therefore now appropriate to examine two of the external determinants that shaped the capital ship controversy: the regime of naval arms control that arose during the period under review and the state of the navy's finances.

CHAPTER II

THE INFLUENCE OF NAVAL ARMS CONTROL AND THE TREASURY ON THE INTERWAR ROYAL NAVY

> We are guarding against every danger except the real danger, which is bankruptcy.[1]
>
> Andrew Bonar Law

> It is cheaper to maintain a limited number of large capital ships than a larger number of small ships.[2]

The regime of naval arms control agreements arrived at during the interwar period defined the practical limits by which the Royal Navy could scale its operational planning. The effects of the several political agreements reached, including the Washington Naval Treaty of 1922, the London Naval Treaty of 1930, the Anglo-German Naval Accord of 1935, and the London Naval Treaty of 1936, influenced the nature of naval strategy and force structure throughout the period of this study. Given the fact that the provisions of these accords affected other fleet units, including the aircraft carrier, the cruiser, the destroyer, and the submarine, their significance went beyond the capital ship. Yet, it was because the capital ship had become the accepted yardstick of naval power that these agreements were possible at all.

Others have examined the negotiations and the treaties at some length, including the vigorous contemporary debate concerning the role and the size of capital ships. As these naval agreements had at times both a quantitative and

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[1]Proceedings of the Fourth Meeting of the Sub-Committee to take Evidence on the Question of the Capital Ship in the Royal Navy, Committee of Imperial Defence held 7 January 1921, Beatty Papers, NMM/BTY/8/3/3, p. 18

[2]Undated note provided to Admiral Chatfield for an article to appear in Home and Empire, Chatfield Papers, NMM/CHT/3/1.

qualitative nature to them, they had a direct bearing on the debate surrounding the vulnerability of the capital ship, the development of naval air power, the planned naval building programme of the Royal Navy, and the way in which maritime power could be exercised. This chapter seeks to move the discussion beyond the political, strategical, and economic realm that has been the hallmark of earlier analyses. Rather, this chapter will review the naval arms control process based on its operational impact on the Royal Navy both at the Admiralty and in the Fleet. In so doing, it is readily acknowledged that navies do not exist in a void, and the underpinnings of maritime operations are very much dependent on external factors, at times, beyond the influence of naval staffs. This phenomenon was perhaps never truer for the Royal Navy than in the period following the Great War.

No less significant than the regime of naval arms control was the influence of the Treasury and the financial environment that Britain faced soon after the First World War. With a National Debt of £7,400,000,000, the interest payments alone to finance this level of debt accounted for 40% of Government spending during the 1920's.[3] Indeed, the major stimuli for entering the naval arms limitation process were fiscal and not strategic. The introduction of the 'Ten Year Rule', the declaration of a 'One-Power Standard', and the frequent delays in establishing the defences of Singapore[4] to a standard able to support a fleet operating at a distance removed from its traditional supporting infrastructure were symptomatic of a country struggling to find the necessary financial resources to

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[3]Paul Kennedy, Strategy and Diplomacy 1870-1945 (London: Fontana Press, 1983), p. 97.

[4]Cabinet approval to proceed with the Singapore project was secured on 16 June 1921 (See ADM 1/8967/96); the project was completed in 1938; Martin Middlebrook and Patrick Mahoney, Battleship: The Sinking of the *Prince of Wales* and the *Repulse* (New York: Charles Scribner's Sons, 1979), p. 5.

meet its diverse maritime commitments. True, most of the initial financing for the Singapore naval base had been advanced by New Zealand, Hong Kong and the Federated Malaya States, yet it is also true that the Admiralty balked at increasing the dimensions of the planned floating dock to support ships drawing more than 40 feet of water (not an inconceivable proposition for a ship of Hood's specifications if damaged) when it realised that the costs involved were in excess of £260,000.[5] Even the Invergordon Mutiny, a disaffection that broke out in units of the Atlantic Fleet in September 1931, had its immediate origins in the financial pressures that prompted the government to reduce the pay of its servicemen. The burden of debt, and then of depression--Britain suffered severe economic downturns in 1921 and 1931[6]--tied to an increasing tendency for each class of warship,[7] including capital ships, to be more expensive and lavish than its predecessor were considerations that made it all the more easy for politicians to press for legal limitations in naval forces.

It would be wrong, however, to suggest that the pressures for naval limitations were entirely financial; they were not. In the aftermath of the 1914-1918 war, a general revulsion against war and the accoutrements of war were much in evidence.[8] Moreover, perhaps because of the

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[5]ADM 1/9264, Board of Admiralty minute 2139 dated 9 December 1925.

[6]John Darwin, Britain, Egypt and the Middle East: Imperial Policy in the aftermath of War 1918-1922 (London: Macmillan, 1981), p. 35.

[7]A feature it may be noted not unique to naval vessels. Contemporary passenger cruise liners exhibited a similar tendency to become ever larger; see 'Major,' 'The Size of Capital Ships,' Naval Review, Volume XXIV, 1936, pp. 251-256.

[8]For a survey of the period's political, social, and economic milieu see A.J.P. Taylor, English History 1914-1945 (New York: Oxford University Press, 1965). For the impact on public opinion and rearmament see N. H. Gibbs, History of the Second World War: Grand Strategy, Volume I,

sacrifices demanded of the governed during the war, successive British Governments of whatever political persuasion were committed to improving their social lot. Finally, at least in the initial postwar period, it was difficult to conceive that a major naval war was in the offing. Japan and the United States, her main naval rivals, were still friendly if not quite friends. As for the other naval powers, Russia and Germany were prostrate in defeat, whilst Italy and France were in a diminished state though nominally victors. Certainly, seen in this light, the introduction of the 'Ten Year Rule' and the 'One-Power Standard' can be viewed as reasonable attempts by the Government to define a practical structure of the political and financial limits associated with Imperial defence planning. It was only later that the benefits of imposing such limits became questionable. This was partly a result of the changing strategic situation--particularly the rise of hostile states in widely separated theatres--and partly the result of entering treaties that failed to provide a regular replacement schedule for capital ships. A review of the period's naval arms control agreements and the finances of the Senior Service is now in order.

The Aftermath of the Great War and the Washington Conference of 1921-1922. On 11 November 1918, the capital ship strength of the Royal Navy, including both ships of dreadnought and pre-dreadnought design, stood at 36 battleships and 8 battle cruisers in full commission with a further two battleships maintained with reduced manning.[9] If measured purely in terms of capital ships then Britannia truly did rule the waves, for the Royal Navy possessed twice as many battleships and battle cruisers as the rest

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Rearmament Policy (London: HMSO, 1976), p. 99.

[9]Statistics Department Admiralty Note of 23 April 1926, Vice Admiral Kenneth G. B. Dewar Papers, National Maritime Museum, Greenwich, NMM/DEW/4, p. 205. At the same time, the Royal Navy operated thirteen aircraft carriers.

of the world's navies combined.[10] This formidable force, though, was quickly reduced as the Navy moved from a force engaged in hostilities to a Service scaled to operate in a peacetime environment. Thus, in late 1918 the Admiralty was advised that:

> The Permanent Secretary pointed out that the whole question under discussion was one of some urgency, as the Treasury had recently given notice that the Vote of Credit would cease to be available after the 31st March next, and that after that date Naval expenditure would be governed by regular Naval Estimates sanctioned by Parliament.[11]

Moreover, three of the four battle cruisers under construction as part of the Emergency War Programme were cancelled.[12] The breadth and speed of this reduction are illustrated by the fact by September 1919 the Royal Navy was planning to operate ten battleships and four battle cruisers in a newly established Atlantic Fleet and six battleships in the Mediterranean Fleet.[13] On paper, at least, this still represented a substantial force for the Royal Navy, but with the adoption of the 'Ten Year Rule' by the Cabinet in the previous month, the Senior Service could only be complacent about its future financial prospects at its peril.

The 'Ten Year Rule' postulated that the Services in forming their budget requests should assume 'that the British Empire will not be engaged in any great war during

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[10]James Neidpath, The Singapore Naval Base and the Defence of Britain's Eastern Empire, 1919-1941 (Oxford: Clarendon Press, 1981), p. 2.

[11]ADM 1/8564/210, Operations Committee un-numbered minute dated 20 November 1918.

[12]Raymond Carl Gamble, 'Decline of the Dreadnought: Britain and the Washington Conference, 1921-1922,' unpublished Ph. D. Dissertation, University of Massachusetts, August 1993,' p. 168.

[13]Admiralty memorandum concerning Post-War Fleet, M. 03710 dated 11 September 1919, Beatty Papers, NMM/BTY/8/1/4.

the next ten years'.[14] The rule was made annually self-perpetuating in 1928 and was not rescinded until 1932.[15] If the 'Ten Year Rule' represented a general framework for overall defence planning, a statement of policy for the Navy of a slightly more specific nature was soon forthcoming. In March 1920, during the parliamentary debates surrounding the Naval Estimates, the Government proclaimed that henceforth the Royal Navy would be maintained at a 'One-Power Standard'.[16] There was nothing new in the idea of pegging the size of the Royal Navy to the relative strength of her rivals. Previously, during the zenith of 'Pax Britannica' when the Naval Defence Act of 1889 was passed, the Royal Navy had operated under a 'Two-Power Standard'. In other words, the Royal Navy would be maintained at a level equal to the number of capital ships of her two strongest naval competitors. When the burden of this had proved too daunting in the run-up to the First World War, it had opted, in turn, to maintain a sixty percent superiority over the Imperial German Navy in capital ships.[17] Now, ironically, having seen off the greatest threat to her maritime position since the Napoleonic wars, Britain, in opting for a 'One-Power Standard', was settling for the maintenance of the Royal Navy at a level which left little to chance.

Such structured formulations in defining British naval policy made sense only in so far as her potential rivals

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[14]John Gooch, 'The Chiefs of Staff and the Higher Organisation for Defence in Britain, 1904-1984' in John B. Hattendorf and Robert S. Jordan, eds., Maritime Strategy and the Balance of Power: Britain and America in the Twentieth Century (Oxford: MacMillan, 1989), p. 191.

[15]G. A. H. Gordon, British Seapower and Procurement between the Wars: A Reappraisal of Rearmament (Annapolis: Naval Institute Press, 1988), pp. 105-107.

[16]Hattendorf and Jordan, eds., Maritime Strategy, p. 191.

[17]David French, The British Way in Warfare 1688-2000 (London: Unwin Hyman, 1990), pp. 152-165.

acceded to such schemes or, failing that, Great Britain maintained the political, financial, and industrial wherewithal to see off any challenges. By 1921, it was by no means certain that this was still the case. When, therefore, in July 1921 the American President, Warren G. Harding, invited the leading naval powers to attend a conference to discuss arms limitations, Britain responded favourably with the proviso that the parley also address issues arising in the Far East.[18] Hence, the Washington Conference sought to address a wide range of issues beyond the limitation of capital ships including the status of China, the limitation of land armaments, and the fortification of Pacific bases. In the event, the United States and Britain refused to guarantee French security, the sine qua non for her acceptance of any limitation in military forces.[19] Yet, if the Washington Conference failed to resolve the issue of land armaments, its proceedings still resulted in the conclusion of nine treaties and twelve resolutions.[20]

For the Royal Navy, the likely benefits accruing from a potential naval arms limitation agreement were tied to the fate of its planned capital ship construction programme. During the war, capital ship construction had been severely disrupted as the need for auxiliary forces, particularly to deal with the enemy's submarine offensive, had to be met.[21] Moreover, the recent war had been arduous

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[18]Buckley and Strong, American Foreign and National Security Policies, pp. 64-65.

[19]Ibid., pp. 66-67.

[20]Stephen Roskill, Hankey: Man of Secrets, Volume II (London: Collins, 1972), p. 239.

[21]Emphasizing this last point, Rear Admiral Andrew Cunningham wrote that 'at the end of the last war, 412 destroyers of a total of 370,000 tons were fully employed against an enemy with no ships at sea except submarines.' See Rear Admiral (Destroyers) Mediterranean letter No. 698/018 dated 20 December 1934 to Commander-in-Chief, Mediterranean, ADM 1/8828/123/35.

on the ships of the Grand Fleet. For example, whereas the anticipated operational life of a light cruiser was estimated at 17 years, those that had served in the 1914-1918 war were deemed to need replacement after 8 to 10 years service.[22] If battle with its opposite number had been rare, the strain of maintaining a high state of readiness in the Grand Fleet in anticipation of battle over a such a sustained period had a telling effect on the anticipated operational life of the battleships and battle cruisers of the Royal Navy. Accordingly, reconstitution of the main units of the Navy was a major objective of the Admiralty. The 1921 Naval Estimates included sanction to construct four battle cruisers of 48,000 tons displacement to be armed with a main armament of nine 16-inch guns, a secondary battery consisting of sixteen 6-inch and six 4.7-inch High Angle guns, thirty-two 2 pounders for air defence, and two 24.5-inch torpedo tubes.[23]

In the event, even before the close of the Washington Conference in February 1922 and the resultant Five Power Treaty, the four battle cruisers so soon laid down were cancelled. As these ships had only been started the previous October and their demise anticipated the actual ratification of the Five Power Treaty,[24] it must be admitted that their real purpose was probably to display British resolution to maintain naval parity in the face of American and Japanese pressure.[25] Beyond the four newly laid down

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[22]ADM 1/8735/72, 'Admiralty Memorandum for the Cabinet and C.I.D., W.D.C.-9' dated 21 November 1921.

[23]Oscar Parkes, British Battleships (London: Leo Cooper, 1966), pp. 650-651.

[24]The Five Power Treaty became effective for Great Britain on 15 October 1923; see ADM 116/2197, Order in Council dated 11 October 1923.

[25]Commenting on the Washington Conference, Elkins notes that the construction of the four battle cruisers laid down in October 1921 was suspended the following month. See entry Midshipman Journal of R. F. Elkins entry dated 18 November 1921, Vice Admiral Sir Robert Francis Elkins

battle cruisers, Great Britain also agreed to decommission a further 22 battleships to meet the terms of the treaty.[26] It has been argued that Britain and the other naval powers were forced into an agreement on capital ships simply because the United States, if required, could build beyond the capacity of any rivals. Notwithstanding America's industrial potential, it is by no means evident that the United States had the will to build to the required level, if an agreement limiting capital ships had not been reached; after all, she did not build cruisers in the requisite numbers to match the Royal Navy. Agreement may have been possible simply because each of the principal naval powers were ostensibly friendly rivals who had recently fought in a common endeavour, saw no prospect of a general war in the short term, and held that the benefits associated with deferring major naval construction outweighed those in proceeding.

The Five Power Treaty recognised that differences currently existed in the relative capabilities of the capital ships of the principal naval powers--America, Japan, and Britain. In the main, those of the Royal Navy were accepted as being older and of a lesser displacement than the ships of its leading rivals. In the absence of battle between them a direct comparison of the capabilities of the capital ships of the Treaty powers was impossible, and remained a matter of conjecture. For its part, the United States Navy was not sanguine about its prospects in a fleet action against the Royal Navy during the first years covering the Washington Treaty. In 1925, a Naval War College study concluded that 'BLUE Fleet as it exists today can not engage the RED Fleet in gun action with any prospects of victory. Every recent tactical exercise, or war game, at the War College has shown this in the most

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Papers, National Maritime Museum, Greenwich, NMM/ELK/1.

[26]Parkes, British Battleships, p. 654.

emphatic manner.[27] Likewise, the claim that British capital ships were older must be tempered with an understanding that the naval powers did not build and commission their ships in a uniform manner. The most modern American battleships (USS Oklahoma[28] through USS Maryland[29]) were newer than the latest Royal Navy ships (HMS Royal Sovereign[30] through Warspite). Yet, in older battleships, the Service enjoyed an advantage. HMS Benbow[31] through HMS King George V[32] were markedly superior to their American counterparts, USS Texas[33] through USS Delaware.[34] Further, the Royal Navy possessed four battle cruisers--a type of warship not found in the United States Navy.[35] Chapter II of the accord which specified which ships could be retained provided the Royal Navy with a somewhat higher aggregate tonnage than the United States and allowed for the initial retention of twenty-two heavy ships. In time, these variances would disappear as replacement vessels were built

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[27]Captain J. M. Reeves, USN, Department of Tactics, cited in Michael Vlahos, The Blue Sword: The Naval War College and the American Mission 1919-1941 (Newport: Naval War College Press, 1980), p. 107.

[28]Commissioned 1916, armed with ten 14-inch guns, and of 28,900 tons.

[29]Commissioned 1921, armed with eight 16-inch guns, and of 32,500 tons.

[30]Commissioned 1916, armed with eight 15-inch guns, and of 25,750 tons displacement.

[31]Commissioned 1914; details as per Marlborough.

[32]Commissioned 1912, armed with ten 13.5-inch guns, and of 23,000 tons displacement.

[33]Commissioned 1914, armed with ten 14-inch guns, and of 27,000 tons displacement.

[34]Commissioned 1910, armed with ten 12-inch guns, and of 20,000 tons displacement.

[35]ADM 1/8735/72, 'Admiralty Memorandum for the Cabinet and C.I.D.' dated 21 November 1921, p. 2.

and both navies would be stabilized at fifteen capital ships by 1936.[36] Still, the Washington accords stipulated more than just numerical limitations in capital ships. Britain, France, Japan, Italy, and the United States agreed to restrict their capital ships to a standard displacement of 35,000 tons, the main armament to sixteen inches, to forego new construction for a period of ten years, and to limit total aggregate tonnage for capital ships and aircraft carriers.[37]

In addition, whilst the Five Power Treaty[38] did not restrict cruiser numbers, it did define the practical limits of that class of warship by limiting their displacement to 10,000 tons and the main armament of non-capital ships to the 8-inch gun. Similarly, the maximum displacement of the aircraft carrier was limited to 27,000 tons; provision was allowed for signatories to exceed the individual tonnage limit by converting two capital ships due for scrapping to aircraft carriers as long as their tonnage did not surpass 33,000 tons.[39] By classifying all existing types of aircraft carriers as experimental, by allowing for their replacement regardless of age, and by limiting their allotted tonnage to little more than twenty-seven per cent of that allowed for capital ships, an

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[36]The Five Power Treaty is reproduced in Harold Sprout and Margaret Sprout, Toward a New Order of Sea Power: American Naval Policy and the World Scene, 1918-1922 (London: Princeton University Press, 1946), pp. 302-311.

[37]Lord Chatfield, It Might Happen Again, Volume II, The Navy and Defence: The Autobiography of Admiral of the Fleet Lord Chatfield (London: William Heinemann, 1947), p. 3.

[38]Through bilateral negotiations with Great Britain, Turkey accepted the Washington Treaty limits on warship size in the Treaty of Lausanne; Germany, in principle, acceded to the restrictions through the Anglo-German Naval Agreement. See ADM 1/8634/184. It can be argued that Germany, with her pocket battleships armed with 11-inch guns on a restricted displacement, honoured the pact more in the breach.

[39]Sprout and Sprout, New Order of Sea Power, pp. 302-303.

implicit assumption of the Five Power Treaty was that the aircraft carrier was a supporting and not a primary determinant of naval power. On balance, the signatories viewed the battlefleet as the primary arbiter of naval power for the life of the treaty.

That an agreement of any kind proved possible was surely a measure of how strong the political and financial pressures were in demanding limitations in naval armaments. In more than one delegation, professional advice was forced to give way to political imperatives.[40] The Admiralty, for one, sought to eliminate the submarine[41] and to forestall any lapse in capital ship construction but to little avail,[42] while the Second Sea Lord and Controller advised against accepting a limit of 35,000 tons displacement for capital ships if the United States moved to convert any of its battle cruisers presently under construction into aircraft carriers.[43] For Great Britain, a measure of the political and financial pressures at work are best exemplified by Prime Minister David Lloyd George's reaction to the Admiralty's proposal to keep capital ship construction alive. Writing to Beatty, the First Sea Lord, the Prime Minister expressed the view that the 'sovereign

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[40]Kennedy, Strategy and Diplomacy, p. 169.

[41]Bryan Ranft, 'Restraints on War at Sea before 1945,' in Michael Howard, ed., Restraints on War: Studies in the Limitation of Armed Conflict (Oxford: Oxford University Press, 1979), p. 53. The Service's view on the abolition of the submarine was not dogmatic. Whilst Britain, as an island nation, was at risk to a guerre de course campaign waged by submarines, its elimination would make development of Asdic, the echo sounding device now commonly known as sonar, extremely difficult and would hinder defence of the Far East against Japan. ADM 1/8616/213 and ADM 1/8715/194 discuss the tactical and operational merits for retention of the submarine.

[42]Hattendorf and Jordan, eds., Maritime Strategy, p. 196.

[43]ADM 1/8615/207, Second Sea Lord to First Sea Lord signal dated 21 November 1921. Ultimately, the battle cruisers USS Lexington and USS Saratoga were converted.

virtue of the naval holiday consists in the fact that there will for ten years be a complete cessation of capital shipbuilding.'[44] The Admiralty's concerns regarding a building holiday were tempered, in part, by the argument that since the laying down of Hood, Britain had already been engaged in a building holiday for five years,[45] while the recent approval of the Cabinet sanctioning the construction of the four new 16-inch gunned battle cruisers had only been gained after much delay and strong resistance from the Treasury. Maintenance of even a 'One-Power Standard' demanded both quantitative and qualitative equality with other naval powers--particularly the United States and Japan, both of whom were well on the way to commissioning battleships armed with 16-inch naval rifles.[46] The initial 'naval holiday' proposed by the United States was eventually modified to allow Britain to build two new ships meeting the displacement and gun restrictions of the Five Power Treaty. Thus, the genesis of HMS Nelson[47] and Rodney,[48] the only 16-inch gunned battleships to commission into the Royal Navy. Finally, though not stated at the time, the Washington Treaty spelt the demise of the battle cruiser--at least, for the Royal Navy. Certainly, they

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[44]David Lloyd George cited in Gamble, 'Decline of the Dreadnought,' p. 341.

[45]ADM 1/8735/72, 'Admiralty Memorandum for the Cabinet and the C.I.D,' W.D.C-9., dated 21 November 1921.

[46]Vis-à-vis the United States Navy, the Admiralty, by 1923, anticipated an American force of 24 battleships and 3 battle cruisers possessing main armament totalling 282 guns. The Service anticipated having 23 battleships and 4 battle cruisers of 244 guns. The Royal Navy deficiency in total guns was mitigated as 6 of the American battleships were equipped with 12-inch guns whilst the smallest main battery in Royal Navy capital ships would be 13.5-inch. See 'Comparative Table - Dreadnoughts Completed' in Beatty Papers, NMM/BTY/8/1/4.

[47]Commissioned 1927, armed with nine 16-inch guns, and of 33,500 tons displacement.

[48]Commissioned 1927; details as per Nelson.

were retained, but never again would, or could, they be built.[49] This was because a displacement limit of 35,000 tons was an insufficient margin to allow a warship to mount a main armament built around the 16-inch gun, while possessing even a minimal degree of armoured protection, and still provide sufficient engineering space to allow a speed in excess of thirty knots. In an appreciation written to describe the design considerations of Hood, but equally applicable to the consequences of the Washington Treaty, Eustace Tennyson-D'Eyncourt,[50] the Director of Naval Construction, noted that 'if it is desired to improve any feature involving weight, the easiest method of doing this is to reduce speed.'[51]

The London Naval Conference of 1930. Following the ratification of the Five Power Treaty in 1922, a general disarmament conference including a further round of talks covering naval arms limitation was convened in Geneva in 1927. Agreement, though, proved elusive, particularly on the issue of cruisers, on which naval building programmes had concentrated in light of the hiatus in capital ship construction that the Washington Conference had largely

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[49]Sketch designs for a new class of battle cruiser were prepared in 1935. Assuming a displacement of 35,000 tons, one alternative envisioned a ship mounting twelve 14-inch guns whilst a second design considered a vessel armed with nine 16-inch guns. In the event, such ships were viewed as of doubtful utility in any war with Japan whilst her existing types (i.e., Hood, HMS Renown, and HMS Repulse) were considered more than a match for any existing European threat. See Director of Naval Construction minute M.F.O. 845/35 dated 19 August 1935 in ADM 1/9379 and 'Protection of Capital Ships' in ADM 1/9387.

[50]Sir Eustace Henry William Tennyson-D'Eyncourt (1868-1951). Director of Naval Construction (1912-1924). Responsible for the designs of the Royal Sovereign, Hood, and Nelson-classes of capital ships, he introduced the 'bulge' as a protective measure in Royal Navy warships; created baronet (1930).

[51]ADM 1/9225, Director of Naval Construction minute C.SecO 1214/19 dated 3 July 1919.

endorsed.[52] As the Admiralty viewed its cruiser numbers insufficient for its total requirements such a shift in shipbuilding priorities was logical. Thus, Dudley Pound, the Director of the Plans Division recommended that:

> As the "NELSON" and "RODNEY" are due to be completed in 1925, and as it will be necessary by the terms of the Washington Conference Agreement to resume the construction of Capital Ships in 1931, the period from 1925 to 1931 will be a favourable time financially to replace Light Cruisers, Destroyers and Submarines and other essential craft.[53]

However, in preparation for the Geneva talks, the Admiralty sought to maintain the general tenets of the Washington Agreement, to extend its provisions to all naval powers (including those not members of the League of Nations) and to achieve naval limitations consistent with meeting the security interests of the British Empire.[54] Altruism aside, faced with having to submit Naval Estimates of the order of £80,000,000 to a Government reluctant to fund such levels of expenditure, the Naval Staff accepted the arms control process as a means of limiting the naval threat.[55] To that end, it agreed to accept a new and lower standard of capital ship for the Geneva talks (-one displacing 28,000 tons and mounting 13.5-inch guns-) whilst internally it investigated whether a battle cruiser armed

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[52]After the Five Power Treaty, Japan announced her intention to increase her cruiser, destroyer, and submarine strength to alleviate her disadvantaged position in heavy ships. See Brian Schofield, British Sea Power: Naval Policy in the Twentieth Century (London: B. T. Batsford, 1967), p. 102.

[53]ADM 1/8702/151, Plans Division minute 01813/23, 'Programme of Construction and Re-construction,' dated 12 June 1923.

[54]ADM 1/8699/118, Joint minute from Deputy Chief of the Naval Staff, Controller, and Assistant Chief of the Naval Staff to Chief of the Naval Staff dated 21 December 1926.

[55]Ibid.

with six 12-inch guns[56] and capable of 30 knots was viable on a similar displacement.[57] Finally, the Admiralty accepted that the life of its existing capital ships could be extended beyond the 20 years that was regarded at the time of the Washington Conference as the limit of its service life. Therefore, where previously it had anticipated building eleven new heavy ships of 35,000 tons displacement and armed with 16-inch guns between 1931-1940, it was now willing to build seven ships on a displacement of 28,500 tons and armed with 13.5-inch guns; such a programme, it was believed, would save roughly £33,000,000 from the Naval Estimates between 1931-1940.[58]

The provisions of the Five Power Treaty which suspended capital ship construction were due to expire in 1932; in the absence of another accord, capital ship construction looked likely to begin anew thereafter. Thus, a further naval conference was held from 21 January to 23 April 1930 in London between the principal maritime powers to discuss additional limitations. The new treaty[59] extended the susepnsion in capital ship building for a further five years and broadened the tonnage ratios applied to capital ships to cover cruisers, destroyers,[60] and

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[56]The 12-inch gun was designed to fire a shell weighing 950-lbs., ADM 1/8779/190.

[57]ADM 1/8715/182, Assistant Chief of the Naval Staff minute M.0797/27 dated 16 March 1927.

[58]ADM 1/8715/188, Plans Division minute 02832/27 dated 6 May 1927.

[59]The ratifications of the treaty were deposited in London on 27 October 1930; see ADM 1/8743/108, Mobilisation Branch un-numbered minute dated 3 November 1930.

[60]The British were allowed tonnages of 150,000 and 52,700, respectively, for destroyers and submarines, ADM 1/8747/82.

submarines.[61] Unfortunately for the Royal Navy neither the Italian nor French navies, parties to the original Washington Treaty, accepted the continuing suspension in heavy ship construction that the Treaty endorsed.[62]

Again, the Admiralty considered several alternative designs for the capital ship in preparation for the talks. Such designs served a three-fold purpose. First, they allowed the Naval Staff to estimate the likely impact future restrictions on the capital ship would have on its survivability. Secondly, they supported the analysis of the Naval Staff in measuring the ability of the capital ship to fulfil its operational role in the light of any new legal constraints, and, finally, they allowed the Admiralty to support and influence the negotiation process. In the internal staff discussions leading to the London Conference of 1930, the Admiralty examined a host of capital ship alternatives, from the Washington standard of vessel of 35,000 tons and mounting 16-inch guns to a much reduced ship armed with 10-inch guns on a displacement of 22,000 tons.[63]

From an operational perspective, the London Treaty of 1930 meant that the Third Battle Squadron, so recently established for the training of boys, would be disestablished without replacement. Moreover, the agreement, in so far as it covered light forces, implicitly made naval planning with the Dominion and Commonwealth Navies essential if a 'One Power Standard' were to be maintained. This new element in naval planning was

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[61]Ernest Andrade, Jr., 'Arms Limitation Agreements and the Evolution of Weaponry: The Case of the "Treaty Cruiser," Daniel M. Masterson, ed., Naval History: The Sixth Symposium of the U. S. Naval Academy (Wilmington: Scholarly Resources, 1987), p. 184.

[62]See ADM 1/9081/53, 'Board Memorandum on a New Standard of Naval Strength.'

[63]ADM 1/9302, Roger Bellairs Minute No. S.O.3513/29 dated 9 January 1930.

encapsulated by Admiral Sir Frederick Field,[64] the Chief of the Naval Staff, in a minute that read in part:

> The situation up till now with regard to the Dominion Navies and their relation to the Royal Navy has needed no special consideration, for the Washington Treaty only fixed the strength of battleships and aircraft carriers, of which the Dominion Navies did not possess any units.
>
> The extension of the rationing system to all classes of ships except sloops in the London Treaty, and the emphasis which has been laid during the Treaty negotiations on the principle of equal status with the Mother Country, has changed the situation....The Admiralty, however, cannot view this policy without anxiety.
>
> Our Empire Fleet, which may, in 20 years' time, consist of Australian, New Zealand, Canadian, Indian and South African units, could not be compared in efficiency with the United States Fleet of the same size, which would be trained and operated as one unit.[65]

In anticipation of the London talks, the Admiralty formulated its irreducible minimum requirements for heavy ships. Thus, Captain Roger Bellairs, the Director of Plans, minuted that:

> After careful consideration, the Admiralty have already decided to propose on the next suitable occasion that 25,000 tons should be adopted as the maximum limit for the battleship....
>
> In deciding on the limit of 25,000 tons a considerable reduction has been made on the limit proposed at Geneva in 1927, and in

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[64]Admiral of the Fleet Sir Frederick Laurence Field (1871-1945); Commanding Officer, King George V (1916); Third Sea Lord and Controller (1920-1923); Commander, Battle Cruiser Squadron (1923); Vice Admiral (Acting), Special Service Squadron (1923-1924); Deputy Chief of the Naval Staff (1925-1928); Commander-in-Chief, Mediterranean (1928-1930); First Sea Lord and Chief of the Naval Staff (1930-1933).

[65]ADM 1/8744/125, Chief of Naval Staff un-numbered minute to Deputy Chief of the Naval Staff dated 19 June 1930. Field was incorrect. HMAS Australia, a battle cruiser disposed of under the terms of the Five Power Treaty, had been a unit of the Royal Australian Navy.

> the Admiralty view an efficient, well-designed battleship capable of fulfilling her function under modern conditions cannot be constructed on a smaller tonnage...[66]

In the event, agreement with the other naval powers on capital ships with such a limited displacement proved impossible, yet the Admiralty's willingness to consider such proposals and others imposing even stricter limits belies a commonly held perception that the Service was fundamentally inflexible to the point of dogmatism regarding the size of the capital ship. It must, however, be observed that the views held within the Admiralty were not universally shared. To this end, Field, whilst serving as the Deputy Chief of the Naval Staff, had previously written to Richmond that:

> it is essential that the tonnage of the individual ships should be such as to permit of her being reasonably capable of withstanding attack from the air and from under the water - the airplane and submarine in fact are the principal dangers to which the capital ship is exposed.
>
> Since no limitation is placed to the number of submarines and aircraft or to the size of the weapons (torpedoes and bombs) which may be carried by these vessels, it is necessary to consider whether the tonnage of the individual capital ship is sufficient to enable her to combine a reasonable degree of offensive power in combination with the necessary protection against the largest bomb and torpedo that is likely to be developed. A study of this problem has led the Admiralty to conclude that, far from being able to accept a smaller tonnage for capital ships, it may be necessary to obtain agreement to some increase.[67]

The London Naval Conference of 1935, the Anglo-German Naval Agreement, and the End of the Naval Arms Limitation Process. With agreement secured to extend the capital ship

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[66]ADM 1/8741/89, Director of Plans un-numbered minute dated 9 July 1929.

[67]Field letter to Richmond dated 7 May 1926, Richmond Papers, NMM/RIC/7/2.

building holiday for an additional five years, it was not long before fresh proposals were being made to limit naval forces. In 1932, the United States Government proposed reducing the number of capital ships from fifteen to ten for the two main naval powers; a proposal vigorously resisted by the Board of Admiralty, although it was willing to consider qualitative limitations including restricting capital ships to a 25,000 displacement and the main armament to the 12-inch gun.[68] One of the reasons why the Admiralty had been willing to countenance a freeze in capital ship construction was to ensure that sufficient funds were available to provide the Fleet with an adequate number of cruisers, both for working with the battlefleet and to protect the extensive sea lines of communication over which passed Britain's trade.[69] Still, accepting that the capital ship still had a role to play, the need for the Royal Navy to begin a sustained construction programme to replace her ageing heavy ships was viewed as paramount. Thus, the Admiralty could argue that:

> Owing to almost all our capital ships having been completed in the war period, and to the building holiday in this category accepted under the London Naval Treaty, it will be necessary to lay down at least one capital ship per year, commencing in 1937.[70]

and

> the Hoover proposals to reduce the number of capital ships from 15 to 10, are quite unacceptable, but even if they could have been accepted they would have had no effect

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[68]'Memorandum by the Sea Lords on the condition of the Navy and its reserves' dated 3 November 1932, Chatfield Papers, NMM/CHT/3/1.

[69]Dick Richardson, The Evolution of British Disarmament Policy in the 1920s (London: Pinter Publishers, 1989), pp. 119-120.

[70]'Memorandum by the Sea Lords on the condition of the Navy and its reserves' dated 3 Nov 1932, Chatfield Papers, NMM/CHT/3/1.

> on the necessity for this replacement programme at any rate for the first eight years, i.e., to 1944 programme inclusive.[71]

A second naval conference convened in London in December 1935 and succeeded in securing the London Naval Treaty of 1936. The numerical restrictions of the Five Power Treaty and the earlier London Naval Treaty were abandoned, but the main armament of the capital ships was now restricted to the 14-inch gun.[72] Again, it was the five principal naval powers that met, but the Japanese left the conference when equality in naval armaments was denied to them.[73] In 1938, France, Great Britain, and the United States agreed to increase the displacement restrictions of the accord to 45,000 tons for capital ships.[74]

As with earlier conferences, the Naval Staff defined its requirements in preparation for the negotiations. Chatfield, the then First Sea Lord, based on his experience with the Battle Cruiser Fleet during the war, placed a premium on capital ship protection, and there is certainly ample proof that the Naval Staff in defining anew its capital ship requirements followed this trend.[75] One study concluded that if future capital ships were restricted to 12-inch guns, a ship of 32,000 tons would be required just to withstand the shellfire of existing 16-inch guns, bombs

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[71]Ibid.

[72]George V. Fagan, 'Anglo-American Naval Relation 1927-1937,' unpublished Ph. D. Dissertation, University of Pennsylvania, 1954, p. 300. To be sure, the adoption of the 14-inch gun limitation was provisional.

[73]Through bilateral negotiations, the British reached agreement with the Soviet Union and Germany to honour the terms of the 1936 accord. See ADM 223/825, 'Confidential Admiralty Monthly Intelligence Report,' No. 215, dated 15 April 1937, p. 3.

[74]Roskill, Naval Policy, Volume II, p. 419.

[75]Chatfield, It Might Happen Again, p. 5.

of 2,000-lbs., or a torpedo armed with a 750-lbs. warhead.[76] Moreover, the Admiralty was even willing to consider capital ships restricted to 11-inch guns on a displacement of 22,000 tons, if cruisers could be limited to guns of 6.1-inch and a displacement of 7,000 tons.[77] The Admiralty certainly recognised that agreement with the United States along such lines would prove difficult, and a warship of such dimensions proved to be but one alternative of several considered.

Finally, mention must be made of the Anglo-German Naval Agreement of 1935. Under the terms of the Versailles Treaty, Germany was precluded from possessing ships larger than 10,000 tons displacement

.[78] With Japan's announcement in December 1934 that she intended to leave the Five Power Treaty and the London Naval Treaty of 1930, Britain faced the prospect of renewed naval competition.[79] Though it damaged Anglo-French relations, the unilateral agreement to allow Germany to build up to 35 per cent of British naval tonnage defined the maximum surface threat that the Royal Navy might have to face in its Home waters.[80] Moreover, unlike the previous agreements

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[76]ADM 1/8802/89/35, 'Naval Staff Appreciation of Requirements for the 1935 Naval Conference,' Admiralty Paper No. 1, April 1934, p. 9. As 32,000 tons represented the approximate displacement of all of the Royal Navy's 15-inch armed battleships, one may conclude that by implication, the battleships of the Queen Elizabeth and Royal Sovereign-classes were recognised by the Naval Staff as being vulnerable based on this assessment.

[77]Ibid.

[78]David Brown, Warship Losses of World War Two (London: Arms and Armour, 1990), p. 165.

[79]R. Ernest Dupuy and Trevor N. Depuy, The Encyclopedia of Military History from 3500 B. C. to the Present (London: Jane's, 1977), p. 1028.

[80]Certainly, the 35% allotted to Germany would be composed largely of newly constructed warships.

she had entered, the Anglo-German Naval Agreement was intended to be a permanent arrangement.[81]

The Naval Estimates of the Interwar Era. It has already been noted that from the end of the Great War the Royal Navy found itself under severe financial pressure. Closely associated with the fiscal stringency of the period was the climate, not just in Britain but in the several democracies, which favoured a general reduction in armaments spending. These two elements formed a powerful dual influence to limit the size of the Naval Estimates of the Service. The pressure to economise was felt at all levels in the Service, from the Board of Admiralty to the ships of the Fleet, whether operating in Home waters or patrolling on the distant stations. It was in the face of such pressure that the Admiralty announced:

> Drastic reductions in the expenditure on administrative services of Fleet are imperatively necessary and are, (the) ???[82] a condition to obtaining the financial provision required for the gradual replacement of our ships and the maintenance of a One Power Standard of material strength. In effecting the economies Admiralty are being guided by the Cabinet's decisions that not less than ten years are available in which to complete our preparation for war and that as a corollary to this, expenditure can be slowly cut down in all directions....The following measures have already been taken or are under consideration :-
> (a) Reduction in the proportion of the ships in active commission and in reserve.
> (b) Curtailment of facilities such as Fleet Drifters and Destroyer Depot Ships.
> (c) Scrapping of vessels whose life is not likely to extend to 1935.
> (d) Slowing down accumulation of war reserves of all kinds.
> (e) Closing down of two dockyards at Home.
> (f) Reductions of the Staffs ashore and afloat.

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[81]Charles S. Thomas, The German Navy in the Nazi Era (Annapolis: Naval Institute Press, 1990), p. 99.

[82]Corrupted group from file copy.

(g) Curtailment of Gunnery, Torpedo and Depth Charge practices.
(h) Complements of H.M.Ships.
(i) Other miscellaneous proposals of less importance including expenditure on education in all its branches....[83]

The financial pressures on the Royal Navy can only partially be measured by an examination of the yearly estimates; their force is best gauged by reviewing the impact they had on naval operations and exercises. However, any evaluation must of necessity begin with the Naval Estimates. Appendix II depicts the Naval Estimates of the 1919-1939 period, reflecting both their absolute and constant value for Sterling where the year 1930 equals one hundred per cent.[84] For most of the interwar period, the Royal Navy saw its funding reduced in absolute terms from one year to the next until rearmament was initiated in the 1930's. With economy the watchword, the operational effectiveness of the Fleet was sacrificed. Notwithstanding the Fleet's concerns discussed in the previous chapter that its system of warship identification had been compromised during the late war and needed immediate replacement, the decision was reached to continue with the existing pattern

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[83]Admiralty signal No. 460. to Commander-in-Chief, East Indies dated 12 September 1925, Richmond Papers, NMM/RIC/7/3a.

[84]No two sources discussing the period's estimates agree. Appendix II depicts the estimates as cited in official Admiralty papers, John Ferris, Men, Money, and Diplomacy: The Evolution of British Strategic Policy, 1919-26 (Ithaca: Cornell University Press, 1989), Bryan Ranft, ed., The Beatty Papers: Selections from the Private and Official Correspondence and Papers of Admiral of the Fleet Earl Beatty, Volume II, 1916-1927 (Aldershot: Scolar Press, 1993), Kennedy, British Naval Mastery, Roskill, Naval Policy, Volume I and Naval Policy between the Wars: Volume II: The Period of Reluctant Rearmament 1930-1939 (London: Collins, 1976), Gibbs, Rearmament Policy, and Charles N. Robinson and H.M. Ross, eds. Brassey's Naval & Shipping Annual (London: William Clowes and Sons, 1935). The weighting used is based on John Stevenson, British Society 1914-45 (Middlesex: Penguin, 1984), p. 117.

of Very Brock Signals due to cost considerations.[85] Moreover, the length of time that a warship served on a overseas commission was increased[86] and the manning for heavy ships was reduced to further drive down the operating costs of the Service. Thus, in 1921 the battleships HMS Centurion,[87] HMS Emperor of India,[88] and Royal Sovereign and the battle cruiser Tiger[89] were commissioned with sixty per cent of their normal complements,[90] whilst by 1924 Hood's ship's company had been reduced by 254 men or 18%.[91] The Admiralty also hastened the decommissioning of the ships of the first King George V-class. Under the provisions of Article II of the Washington Naval Agreement, HMS Thunderer,[92] HMS Ajax,[93] King George V and Centurion were to be paid off upon the completion of the Nelson and Rodney.[94]

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[85]ADM 1/8558/135, Admiralty letter M/SD435 to Commander-in-Chief, Atlantic Fleet dated 24 December 1919 and Assistant Chief of the Naval Staff unnumbered minute dated 26 May 1920.

[86]ADM 1/8567/250, Admiralty Fleet Order M.20265/22 dated 24 February 1922.

[87]Commissioned 1913; details as per King George V.

[88]Commissioned 1914; details as per Marlborough.

[89]Commissioned 1914, armed with eight 13.5-inch guns, and of 28,500 tons displacement.

[90]ADM 1/8948/271/1923, Director of Plans minute P.D. 01629/21 regarding 'The Naval Situation of the British Empire in the Event of War Between Japan and the United States of America.'

[91]ADM 1/8659/74, Committee on Provision of Personnel for Ships under Construction, 1924-25, Office Memorandum No. 37 dated 15 April 1924.

[92]Commissioned 1912, armed with ten 13.5-inch guns, and of 27,000 tons displacement.

[93]Commissioned 1913; details as per King George V.

[94]In the event, Nelson and Rodney did not commission until 1927. Thus, the Service decommissioned King George V, Ajax, Thunderer, and Centurion earlier than required for financial and manning considerations.

The Admiralty sought to redistribute the battleships remaining so that the ships of the Royal Sovereign and Queen Elizabeth-classes would be available to serve in the Mediterranean as a strategic reserve.[95] Following the combined exercises of the Mediterranean and Atlantic Fleets to be held in the Spring of 1926, the Iron Duke,[96] Marlborough, Emperor of India, and Benbow serving in the Mediterranean were to return to England and form the Third Battle Squadron, Atlantic Fleet, where their primary duty would be to serve as a training squadron.[97] To this end, the following signal was made:

> In view of the scrapping in 1926 of battleships of KING GEORGE V class and THUNDERER it is necessary to reduce four battleships from full commission to reduced complement partly to preserve the drafting margin and partly to provide accommodation for training of boys afloat. Their Lordships accordingly propose early in 1926 to transfer the four battleships of the IRON DUKE class now in the Mediterranean to the Atlantic Fleet and to reduce them to one half active service complement in peace completing them to full complement with boys for training. In war a three-quarter active service complement will be provided, the full complement being complemented with reserves. At the same time Their Lordships propose to transfer two battleships of the REVENGE class to the Mediterranean.[98]

Tactically, the impact of strict economy on the Service's programme of exercises was no less pronounced. One observer noted of the Atlantic Fleet's autumn manoeuvres of 1927 that it was:

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[95]The strategic rationale for such basing is specified in Admiralty letter M.0472/22 cited in ADM 1/8700/121.

[96]Commissioned 1914; details as per Marlborough.

[97]ADM 1/8700/121, 'Admiralty Fleet Order 3038.--Battleships-Redistribution dated 30 October 1925.'

[98]ADM 1/8700/121, Admiralty signal to Commanders-in-Chief, Atlantic Fleet and Mediterranean dated 7 October 1925.

a revelation of the extent to which economy stifles the work of the Navy. Before the war the Fleet used to spend five days out of seven at sea. To-day it spends only two, and yet it is admitted that, although much useful training can be given in harbour, only practice at sea can promote the human material from the technically passable to the technically excellent. Exercises often have to be postponed for days because there must be no risk of losing valuable torpedoes or wasting any moment of the total time available upon less than perfect conditions.[99]

Moreover, at a cost of £5,500 each, torpedoes were reused in exercises rather than simply expended.[100] Following their run, they were designed to rise to the surface and emit a cloud of smoke to speed their retrieval by attendant ships.[101] The failure to retrieve a torpedo following an exercise was not a matter to be treated lightly, at least aboard the battleship Emperor of India, and when that ship lost a torpedo during its manoeuvres of August 1924, a court of enquiry was convened.[102] Further, the drive for economy meant that steaming at speed was greatly restricted. Thus it was that the Commander-in-Chief of the Atlantic Fleet issued a general order to the First Battle Squadron that:

> In view of the necessity for economy in the expenditure of oil fuel, the full power

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[99]From an undated newspaper article titled "'The Atlantic Fleet. Autumn Manoeuvres at Sea. A Week's Impressions.' from Our Special Correspondent" in Captain John F. Beaufoy-Brown Papers, Liddell Hart Centre for Military Archives, King's College, London.

[100]'Notes on Technical Subjects,' Vice Admiral Sir Geoffrey Barnard Papers, Imperial War Museum, London, IWM/P256, p. 3.

[101]Martin H. Brice, The Royal Navy and the Sino-Japanese Incident 1937-41 (London: Ian Allan, 1973), p. 28.

[102]See Midshipman Journal of G. T. Lambert, entry for 18 August 1924, Captain G. T. Lambert Papers, Imperial War Museum, London, IWM/90/19/1.

> trial the Quarter ending 31st March will not take place, but the full calibre firing and torpedo individual long range firings should be carried out a speed not less than 17 knots. The exercises should be arrange so that this speed may not be maintained for a longer time than necessary.[103]

Lest one believe that the above measure was an aberration, it should be noted that capital ship evolutions in exercises of the interwar era were frequently conducted at speeds hardly representative of active service conditions. This will be addressed in detail later, but a scenario featured regularly in tactical evolutions of the period was for a force of battleships, typically escorting a slow moving convoy, to be attacked by light surface forces such as destroyers.[104]

The Impact of Finance on the Royal Navy and the Naval Arms Limitation Process Evaluated. Criticism of the period's several naval treaties by both former serving officers and historians has been legion. The late Stephen Roskill opined that:

> Looking back to-day one cannot but conclude that of all the ideas hopefully devised by man to reduce the likelihood of war, and of all the measures of alleged economy forced by politicians on the fighting services, the naval limitation treaties will stand for all time not only as the most ineffective, but also the most dangerous to those nations which loyally tried to abide by their restrictive terms.[105]

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[103]Commander-in-Chief, Atlantic Fleet signal A.H. 0051/3 to Vice Admiral Commanding First Battle Squadron dated 15 February 1920, Rear Admiral Montague G. B. Legge Papers, Imperial War Museum, London, IWM/P.394.

[104]For example, see Midshipman Journal of Henry A. King, entry dated 17 January 1922, Captain Henry A. King Papers, Imperial War Museum, London, IWM/90/23/1 and C. R. Benstead, H.M.S. Rodney at Sea: Being the Story of the Second Commission of His Majesty's Battleship 'Rodney' (London: Metheun & Company, 1932), p. 10.

[105]S. W. Roskill, H.M.S. Warspite: The Story of a Famous Battleship (London: Collins, 1957), p. 86.

while in his memoirs, Admiral Chatfield registered strong disagreement over the London Naval Treaty of 1930 to the point where he believed the Labour Government of Ramsay MacDonald had:

> put the British Fleet into a strait jacket, padlocked it and sealed it "not to be unlocked till December 31st, 1936". The rebuilding of the old capital ships, so carefully planned by the Admiralty at the Washington Conference, had been put back five long years, and our power properly to restore the cruiser, or destroyer, situation during those five years had been destroyed.[106]

These assessments, written as they were after the fact, and with the legacy of a second great war are telling, but what of their accuracy? Chatfield is doubtless correct that the extension of the capital ship building holiday for a further five years was detrimental to the maintenance of the fighting efficiency of the Fleet, and one noted historian has commented that by the 'provisions of the London Treaty of 1930 the British Navy was reduced to the lowest point reached between the two Wars in strength and efficiency'.[107] Yet, Chatfield was being less than honest in claiming that an outcome of the Washington Conference was that the Admiralty had arrived at a coherent capital ship building programme. Indeed, the opposite was the case. As has already been cited, the Admiralty and the First Sea Lord, Beatty, in particular, had strenuously resisted attempts to abandon a sustained regime of replacing the Royal Navy's capital ships. The argument was made on both technical and economic grounds that it was imperative to have a regularized building programme and that any suspension in

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[106]Chatfield, It Might Happen Again, p. 115. Original emphasis.

[107]F. H. Hinsley, Command of the Sea (London: Christophers, 1950), p. 22.

capital ship construction was fraught with risk.[108] Chatfield, then serving as the Assistant Chief of the Naval Staff, briefed the members of the Imperial delegation at the Washington Conference on these risks. He argued, in part, that:

> the main and immediate danger is that the fleet of the British Empire the sole force on which she is invited to rely for the next 15 to 18 years, will consist of war-worn vessels which even at the present time are for the greater part unreliable, since they are with the exception of the "HOOD" and to some very minor extent the "Royal Sovereign" class, provided with no protection against the torpedo, mine and air attack of even 1921.[109]

Additionally, the Admiralty argued that the industrial base sustaining the Royal Navy was in danger of collapse, if new orders were not placed. In this the Admiralty overstated their case, but serious effects there were nonetheless; for instance, when rearmament was pursued in earnest the limited number of skilled draughtsmen available resulted in a delay of nine months for the completion of the first two ships of the second King George V-class when the Naval Staff approved a design change that saw the inclusion of a twin 14-inch mount to allow for additional armour protection.[110] Further, it would prove more expensive, overall, to have to complete several ships at the end of the treaty period than to construct the same number of ships over the life of any accord.[111] Moreover, the fighting efficiency of the fleet would be impaired, if the technology underpinning the capital ship was not undergoing

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[108]Gamble, 'Decline of the Dreadnought,' pp. 341-347.

[109]ADM 1/8615/207, Assistant Chief of Staff statement to the British Empire Delegation dated 9 December 1921. Original emphasis.

[110]ADM 1/9411, First Lord minute M.F.O.102/36 to the Naval Staff dated 20 March 1936.

[111]Gamble, 'Decline of the Dreadnought,' pp. 383-384.

constant fielding and testing. Each of these points is valid, and, yet, each in their way applied no less to the other signatories. At least for the Royal Navy the agreement reached in 1922 allowed for the construction of Rodney and Nelson. Whilst these ships were to experience numerous teething problems, they were viewed by many as the definitive statement in capital ship design when they commissioned.[112]

Chatfield noted that a benefit of the 1922 accord was that it put a stop to the process whereby each naval power attempted to go one better in capital ship design than their rivals. A measure of stability and predictability was thus introduced at the top end of naval construction. This was doubtlessly so, but the Admiralty nevertheless ensured that Nelson and Rodney were completed with an additional naval rifle over their Japanese and American counterparts. Notwithstanding the 1922 agreement, within three years new economies were sought in the Service's ten year projected shipbuilding programme. Whilst the economies desired covered the entire spectrum of the Royal Navy's shipbuilding programme, and not just heavy ships, the total of such economies--almost £57,000,000 over the 1925-1935 period--indicate that in the absence of the 1922 naval agreement, the Service would have faced still greater cuts of a unilateral nature.[113]

As for Chatfield's lament about the 1930 London Agreement limiting the cruiser strength of the Navy, it must be

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[112]Those holding such thoughts included Admiral William Leahy, Rear Admiral Jehu Valentine Chase, and Commander Harold Train of the United States Navy. Chase is credited with writing the first paper on the square law effect on the concentration of force. See Wayne P. Hughes' Appendix C in Bradley A. Fiske, The Navy as a Fighting Machine (Annapolis: Naval Institute Press, 1988), p. 375 and ADM 1/9272. Train, retiring as a Rear Admiral in 1946, had specialised in gunnery, commanded USS Arizona (1940), and served as Director of Naval Intelligence (1942-1943).

[113]ADM 1/8685/152, Ten Year Building Programme, Plans Division minute 02171/25 dated 6 March 1925.

recalled that at no time after 1919 did the Service possess 70 cruisers--the defined irreducible minimum for that class of warship.[114] Indeed, in agreeing to limit its cruiser strength to 50, Britain faced the ironic position that she would actually have to increase her cruiser numbers.[115] Turning to Roskill, his assertion that the naval limitations process was both dangerous and ineffective contains an element of truth. Yet, for Britain, the treaty process pursued with its rivals was a means of achieving economies in concert with an overall strategic vision. The alternative was the imposition of unilateral naval

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[114]Richardson, Evolution of British Disarmament Policy, p. 120. In 1937, the Naval Staff determined that 100 cruisers were required, See 'Board Memorandum on a New Standard of Naval Strength, ADM 1/9081/53. Previously, in assessing its expected wartime requirements, the Naval Staff determined that 148 cruisers or armed merchant cruisers would be needed in the event of a conflict with Japan. See 'Naval Staff Appreciation of Requirements for the 1935 Naval Conference,' Admiralty Paper No. 1, April 1934, ADM 1/8802/89/35.

[115]The active cruiser strength of the Service (including the Royal Australian Navy and the New Zealand Division) during the interwar years based on Admiralty records and the Navy List was:

1918	109	ADM 1/8744/140.
1919	84	ADM 1/8685/152.
1920	68	Ibid.
1921	52	Ibid., n.b., ADM 1/8735/72 gives it as 54.
1922	35	ADM 186/61.
1923	50	ADM 1/8685/152.
1924	48	Ibid.
1925	33	Navy List, January 1925, pp. 201-210.
1926	34	Navy List, January 1926, pp. 201-210.
1927	33	Navy List July 1927, pp. 201-210.
1928	36	Navy List, July 1928, pp. 201-210.
1929	37	Navy List, July 1929, pp. 201-210.
1930	35	Navy List, January 1930, pp. 201-210.
1931	34	Navy List, January 1931, pp. 201-210.
1932	33	Navy List January 1932, pp. 201-210.
1933	32	Navy List, January 1933, pp. 200-209.
1934	34	Navy List, July 1934, pp. 200-209.
1935	33	Navy List, July 1935, pp. 200-209.
1936	35	Navy List, July 1936, pp. 200-209.
1937	33	Navy List, January 1937, pp. 200-209.
1938	34	Navy List, January 1938, pp. 200-209.
1939	37	Navy List, July 1939, pp. 241-249.

reductions made in the absence of any agreement requiring reciprocal cuts by its naval rivals. Thus, it was that during the time of the Washington Treaty negotiations in December 1921, the Royal Navy maintained only 16 of its heavy ships in full commission. Ultimately, the Five Power Treaty reached provided the Service sanction for operating 22 capital ships in the near term.[116]

This situation, it should be noted, existed similarly eight years later at the time of the first London Agreement, a fact that has for too long gone unobserved. Hinsley may be correct in his dating of the nadir of the interwar navy, but it is erroneous to tie the decline to the treaty process. Rather, it was finance, or more appropriately the lack of it, that allowed the Service to reach such a state of affairs. The 1930 agreement may have resulted in the scrapping without replacement of the ships of the Third Battle Squadron and Tiger of the Battle Cruiser Squadron, but as an operationally effective force the Third Battle Squadron had ceased to count from at least 1 January 1930 when it was made an independent command of the Reserve Fleet.[117] The decision to change the status of the Third Battle Squadron was the result of the ships of the Queen Elizabeth-class returning to Britain from Mediterranean duties.[118] With the Government's desire to find new savings in the Naval Estimates based on extending the 'Ten Year Rule,' the Reserve Fleet came under scrutiny. The Admiralty was loath to touch the active fleet, but a strategic assumption that a major war was not likely for ten years allowed the readiness of the Reserve Fleet to be

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[116]ADM 1/8616/218, Plans Division un-numbered minute dated December 1921, 'Proposed Redistribution of the Fleet in the Event of the Washington Conference Proposals Being Carried Out.'

[117]ADM 1/8736/92, Mobilisation Branch signal to Commander-in-Chief, Atlantic Fleet et al. dated 13 December 1929.

[118]ADM 1/8736/92, Deputy Chief of Naval Staff minute M.02712/29 dated 10 October 1929.

reduced. Thus, the Plans Division noted:

> the fully commissioned fleet is only sufficient now to carry out the tactical and sea training required, to maintain a one-power standard and to uphold our political and commercial interests abroad. So far as the fully commissioned fleet, therefore, is concerned, the reply of the Admiralty to the Chancellor of the Exchequer is not affected by the 10 year decision and no economy in this direction can be suggested.
> 3. Apart from the fully commissioned fleet, however, there is the reserve fleet. Under the 10 year basis it is unnecessary for emergency purposes to have the reserve fleet available for service at short notice, provided the requirement for a minor emergency which might break out without warning could be met without the use of the reserve fleet.[119]

The staff assessment continued by noting that if the Third Battle Squadron did form a part of the Reserve Fleet:

> The chief disadvantage in reducing this squadron to reserve is that the tactical training of the Atlantic Fleet will suffer and, to this extent, the efficiency of the active fleet will be prejudiced.[120]

Still, the same assessment concluded that in the event of an emergency, the Atlantic Fleet's deficiency in cruisers were likely to be greater than any shortfall in heavy ships, and, if necessary, cruisers could assume the task of training boy entries.[121] Thus, the demise of the Third Battle Squadron as an operational entity predated the London Agreement of 1930.[122] Moreover, the qualitative

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[119]ADM 1/8737/97, 'Possible Economies in the Naval Estimates Consequent on the Adoption of the New 10 Year Basis,' Plans Division minute 03102/28 dated 5 September 1928.

[120]Ibid.

[121]Ibid.

[122]One can argue that the Iron Duke-class failed to have operational value by 1925 when they were formed into Third Battle Squadron. Manning existed for only two of the five main turrets, no ratings were provided for the secondary

terms arrived at in the Five Power Treaty (e.g., 35,000 tons displacement and main guns of 16-inch) were in consonance with the general British view of the capital ship as determined by Post-War Questions Committee of 1920.[123] Prior to the Washington accord, the Admiralty was aware that both the Americans and Japanese navies were designing ships with armament that would render the 15-inch gun of her latest heavy ships in commission obsolete.[124] Jellicoe, after inspecting the gun foundry of the Washington Navy Yard, advised that the United States Navy was likely to adopt the 20-inch gun[125] for her next class of capital ships whilst the Imperial Japanese Navy was reported to be developing an 18-inch naval rifle.[126] Accepting the cost and the operational difficulties the Royal Navy would have faced, given her existing dockyards, if it had to operate heavy ships of the dimensions required to match those of her rivals, the critics of the period's accords fail to address how the Service would have fared in the absence of the 1922 agreement.[127] That Britain, in 1938,

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batteries, and only practice ammunition was embarked. See 'Complement of "Iron Duke" Class,' undated and un-numbered minute, ADM 1/8700/121.

[123]ADM 1/8586/70, 'C.B. 01557.' Given the state of British marine engineering in the early 1920's, the adoption of the 16-inch gun in a triple turret configuration on a displacement of 35,000 tons probably resulted in an unbalanced ship design but no more so than contemporary Japanese and American warships.

[124]Ibid.

[125]ADM 1/8580/22, Jellicoe letter No. 61/P.230 to Admiralty dated 20 January 1920.

[126]Confidential Admiralty Monthly Intelligence Report, Number 13, dated 15 May 1920, Richmond Papers, NMM/RIC/4/1.

[127]Designs for new classes of battleships and battle cruisers prepared in 1920 anticipated warships exceeding 51,000 tons displacement and drawing about 33 feet of water. As the Suez Canal, at that time, was limited to taking ships drawing less than 31 feet, the ability to use the heavy ships of the Mediterranean Fleet as a strategic reserve would have been at risk in the absence of a naval

designed a new class of battleships[128] around a displacement of 40,000 tons when she was permitted to build to a 45,000 tons standard, indicates that operational considerations, such as the limits imposed by the Suez Canal,[129] exerted a strong influence in her willingness to accept naval limits.[130]

However, notwithstanding the valid technical and economic factors that the Admiralty claimed argued against, at least, the clauses of the Five Power Treaty dealing with the suspension in capital ship construction, it must be questioned whether the 1922 agreement prevented the Royal Navy from carrying out its responsibilities. Afterall, the treaty guaranteed capital ship parity with United States Navy and a clear superiority over any other rival. Further, the Five Power Treaty did nothing to reduce the margin of superiority that the Royal Navy enjoyed over the

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agreement. See Director of Naval Construction minute C. Sec.0530/20 dated 21 October 1920, ADM 1/9232.

[128]Designated as the Lion-class they were to be armed with nine 16-inch guns, sixteen 5.25-inch guns, and six 2-pdr. Mark M pom-poms. Though laid down, they never completed. See "Legend of Particulars of Proposed Battleships of the 'Lion' Class" dated 6 December 1938, ADM 1/9441.

[129]Many commentators have noted the restrictions of the Service's docking facilities but fail to realise that the primary limitation was the ability of the Suez Canal to accept deep draught ships. If required, the Royal Navy planned to tow floating drydocks to Trincomalee and Singapore and station a repair ship at Singapore to service its heavy ships, if war with Japan arose before the completion of the Singapore naval base; see 'The Naval Situation of the British Empire in the Event of War Between Japan and the United States of America,' PD 01629/21, ADM 1/8948/271/1923. As designed, the Suez Canal could not accept ships drawing more than 25 feet. Later, it had been dredged to accept ships drawing as much as 31 feet. WO 78/2320, the Hydrographer's survey of 1879 based on an original French survey of 1876, documents the initial depth of the canal.

[130]ADM 1/9441 undated minute M.F.O. 4349/38 and ADM 1/9434, First Sea Lord to First Lord minute P.D.06806/38 dated 26 May 1938.

United States Navy in non-capital ship forces such as cruisers. Moreover, it has already been demonstrated that the fiscal pressures facing the Royal Navy that arose immediately after the Armistice forced the Service to unilaterally reduce the number of ships in commission. Thus, in one sense the Five Power Treaty and the London Naval Agreement of 1930 merely codified, for the Royal Navy, reductions that were being faced anyway, with the benefit of also legally limiting naval competition from its principal rivals.

Balanced against these factors must be that an implicit assumption of the Five Power Treaty was that the capital ship existed to do battle with other capital ships. The very raison d'être of the capital ship since its transformation in Dreadnought was to outsail, outgun, and outfight any other surface warship. Yet, the Five Power Treaty overlooked the fact that a subsidiary, but nonetheless vital, mission of naval forces, including capital ships, was to support military operations ashore. The Dardanelles campaign of the recent war was evidence enough of this task, and here the experience had been anything but reassuring for the Royal Navy. During that in-shore operation, the Navy's battleships and battle cruisers proved at risk from mines, land-based artillery, and torpedoes fired from both submarines and destroyers. Two pre-dreadnoughts, HMS Irrestible and HMS Ocean, were lost on 18 March 1915, while three other pre-dreadnoughts, HMS Goliath, HMS Majestic, and HMS Triumph were sunk in May 1915.[131] Tonnage restrictions, then, on capital ships, if set too great, might preclude their use during in-shore operations, and, yet, it was just those ships that would be most useful and survivable.[132]

In 1926 one officer who certainly understood such

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[131]Halpern, Naval War in the Mediterranean, pp. 47-124.

[132]Survivability being a function of the amount of reserve buoyancy possessed by a ship.

risks was Admiral Sir Roger Keyes,[133] Commander-in-Chief, Mediterranean. With the possibility of war looming, Keyes, who had served as the Chief of Staff to the Commander of the Eastern Mediterranean Squadron[134] during the Dardanelles campaign, estimated that the Mediterranean Fleet would require no less than ten battleships, if war with Turkey broke out.[135] When it is recalled that sufficient personnel to man nine of the required minesweepers for any potential operation could be secured only by transferring personnel from the battleship HMS Valiant,[136] it becomes apparent that by this early date, the Royal Navy was pressed to meet the challenges of even a minor naval power. In fact, from the time of the Armistice until 1922 the heavy ships of the Mediterranean Fleet had been engaged in a series of operations in the Bosporous and the Crimea. Whether facing Turkish Nationalist forces or supporting the White Russian forces against the Bolsheviks, the capital ships of the Royal Navy were engaged in combat operations including shore bombardment and the evacuation of refugees. The scale of these operations, in time, required the Admiralty to order the deployment of three additional battleships with supporting forces from the Atlantic Fleet to augment

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[133]Roger John Brownlow Keyes (1872-1945). Commanding Officer, Centurion (1916-1917); Rear Admiral, First Battle Squadron (1917); Commander, Battle Cruiser Squadron (1919-1921); Deputy Chief of the Naval Staff (1921-1925); Commander-in-Chief, Mediterranean (1925-1928); Commander-in-Chief, Portsmouth (1929-1931); and ennobled (1943).

[134]Rear Admiral John M. de Robeck.

[135]Keyes cited in Paul G. Halpern, The Keyes Papers, Selections from the Private and Official Correspondence of the Fleet Baron Keyes of Zebrugge, Volume II, 1919-1938 (London: George Allen & Unwin, 1980), Commander-in-Chief Mediterranean Fleet letter No. 242/0095/12 to Admiralty, p. 167.

[136]Commissioned 1916, armed with eight 15-inch guns, and of 31,000 tons displacement.

the ships then on station.[137]

The above examples illustrate the vital importance of numbers, and the major flaw of the Five Power Treaty and London Naval Treaty from a British standpoint was that a force of capital ships could not be maintained--especially as at any time a certain number of battleships and battle cruisers would have to undergo refits--adequate to meet her maritime requirements. The argument can be made that the same constraints applied to the other signatories, and, to a point, this is a valid criticism,[138] yet, the Royal Navy was at a significant disadvantage in trying to project power into Asia and the Pacific. Whilst she had an extensive network of overseas dockyards including Malta in the Mediterranean, Simonstown in South Africa, Esquimalt in Canada, Trincomalee in Ceylon, and Hong Kong in China, they were either strategically vulnerable, underdeveloped, or at a distance removed from the probable theatre of operations. Hence, the necessity of developing Singapore as a naval base of sufficient capability to support a fleet.[139] In the end, the naval treaties negotiated were divorced from the operational responsibilities that the Royal Navy faced. This was true in 1922; it was even more the case in 1930 and 1936. Far better would it have been for the Service, if it had been allowed to retain in an inactive and demilitarised state a number of its heavy ships. Such an option would have allowed a measured programme of arms reduction to proceed and reduced the day-to-day running

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[137]Roskill, Naval Policy, Volume I, p. 198.

[138]This is particularly true of France which also had worldwide imperial responsibilities stretching from Africa to the Americas, Asia, and the Pacific. Yet, geographically she could never escape that the first call on her defences were the borders of Metropolitan France.

[139]Under provisions of Article 19 of the Washington Agreement, Britain was precluded from developing Hong Kong as a fortified naval base. See Ian Cowman, "An Admiralty 'Myth': The Search for an Advanced Far Eastern Base before the Second World War,' The Journal of Strategic Studies, Volume 8, Number 3, September 1985, p. 317.

costs of the fleet. More importantly, though, it would have allowed the Royal Navy to reconstitute the fleet in a timely manner, if ever strategic circumstances warranted such a change.

As negotiated, it was only on paper that any degree of superiority in capital ship strength existed for the Royal Navy. Whilst concentration of her forces could theoretically provide local superiority, the fact remained that given the breadth of her maritime commitments such a concentration could only take place if British diplomacy ensured that only one crisis at a time arose; hence the truth of Richmond's observation that imperial defence in the Far East was based on 'the illusion that a Two-Hemisphere Empire can be defended by a One-Hemisphere Navy.'[140] Since the concentration of British capital ships in Home waters prior to World War I, the Royal Navy in Asiatic waters was primarily a light cruiser and flotilla force whose mission was one of presence.[141] Maintaining British commercial interests (particularly along the Yangtze and Yellow Rivers in China) and the suppression of piracy were its day-to-day missions.[142] As long as the Anglo-Japanese Treaty was in effect, the British had no real need to maintain capital ships in the Far East. However, the price of securing the Five Power Treaty was

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[140]Cited in Brian Bond and Williamson Murray, 'The British Armed Forces, 1918-39,' in Allan R. Millet and Williamson Murray, eds., Military Effectiveness, Volume II: The Interwar Period (Boston: Unwin Hyman, 1988), p. 108.

[141]In 1919, the ships of the China Station included the flagship HMS Hawkins, the Fifth Light Cruiser Squadron composed of HMS Cairo, HMS Carlisle, HMS Capetown, and HMS Colombo, the light carrier HMS Ark Royal, and a flotilla each of destroyers and submarines. See 'Post-War Fleet' memorandum M. 03710 dated 11 September 1919 in Beatty Papers, NMM/BTY/8/1/4. Roskill states that the force was also to include one battle cruiser. See Roskill, Naval Policy, Volume I, p. 106.

[142]ADM 1/8727/146, Admiralty M.01565/21, 'Standing Instructions for the Guidance of the Commander-in-Chief on the China Station,' dated 1 February 1922.

that Britain had to forego renewal of her Japanese pact. Whilst it may be true that the United States and Canada insisted on such a course, the fact remains that the agreement with Japan, in the absence of a German or Russian threat, in the postwar era could only have brought Britain into conflict with one other power--the United States. British policy was to find accommodation with the United States, and a treaty that gave her superior advantage over the third naval power was a better deal than an agreement that put her at odds with potentially the premier naval power.[143] It may very well be the case that the interests of Britain and Japan were bound to clash, even if the Anglo-Japanese Treaty had been renewed. Still, after 1922 and in the absence of any capital ships, British naval forces could only operate in Asiatic waters at the sufferance of the Japanese. A point Beatty, as First Sea Lord, advised the Government.[144] At the time of the Imperial Conference in June 1921, Beatty estimated that a war with Japan would require the despatch of eight battleships and sixteen cruisers.[145] Given the ongoing commitment of capital ships in the Eastern Mediterranean area, it is as well that the British did not have to face such a deployment.

As for the refitting of capital ships, it did take place, but the time spent out of commission was a cause of concern--most acutely from the time of the Abyssinian Crisis onward. It was very much a case of having to accept a short-term loss for the promise of a longer-term gain. Writing after the fact, Chatfield admitted that:

> During the last three years of my time as First Sea Lord, I had continuous anxiety because we had only twelve available

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[143]See ADM 116/1774, 'Memorandum for the Cabinet. Navy Estimates and Naval Policy,' dated 13 February 1920.

[144]W. David McIntyre, The Rise and Fall of the Singapore Naval Base (London: MacMillan, 1974), p. 34.

[145]Stephen Roskill, Admiral of the Fleet Earl Beatty: The Last Naval Hero-An Intimate Biography (London: Collins, 1980), p. 307.

> battleships. In crisis after crisis, this hampered the Admiralty and, indeed, the Cabinet in their foreign policy, and the Dominions especially, felt the weakness of the Fleet.[146]

Indeed, the problem was at times even direr than Chatfield posited. Writing to Admiral Sir Frederic Dreyer,[147] the Commander-in-Chief, China Station, in February 1934 Chatfield noted that:

> For the next two years I shall have 4 Capital ships laid up only leaving 11 ships at sea. These will be distributed normally as - 5 Battleships in the Mediterranean, 4 Battleships and 2 Battle Cruisers in the Home Fleet.[148]

Winston Churchill observed an even more depressing state of affairs. Writing to his fellow parliamentarian, the ubiquitous Admiral Keyes, as the Abyssinian Crisis was beginning to break, he observed:

> It is rather odd however, that at this time of crisis seven out of fifteen of our capital ships are on the sick list, to wit: Royal Oak, Warspite, Malaya, Repulse, 'paid off into dockyard hands'; Ramillies rammed by a Hun, Rodney and Nelson, cracked gunslides.[149]

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[146]Chatfield, It Might Happen Again, p. 123

[147]Admiral Sir Frederic Charles Dreyer (1878-1956); Flag Captain, Orion (1913); Commanding Officer, Iron Duke and Flag Captain to Commander-in-Chief, Grand Fleet (1915-1916); Director of Gunnery Division, Naval Staff (1920); Commanding Officer, Repulse (1922-1923); Assistant Chief of the Naval Staff (1924-1927); Commander, Battle Cruiser Squadron (1927-1929); Deputy Chief of the Naval Staff (1930-1933); Commander-in-Chief, China Station (1933-1936); retired (1939) and recalled for service in World War II; retired (1943).

[148]Chatfield to Dreyer letter dated 2 February 1934, Chatfield Papers, NMM/CHT/4/4.

[149]Churchill cited in Halpern, ed., Keyes Papers, Volume II, pp. 344-345. HMS Ramillies was damaged in a collision with the German ship Eisenach off Dover on 31 August 1935. See R. A. Burt, British Battleships 1919-1939 (London: Arms

Another consideration that must be taken into account is that many of the capital ships of the Royal Navy were materially deficient even before the dangers of the air threat had become pronounced. This aspect of British capital ship design had been noted by Jellicoe whilst serving as the Second Sea Lord in 1914. In a memorandum written shortly before the outbreak of war he remarked that:

> The inferiority of the protection of British ships of 1909-1911 classes against guns and torpedoes is very striking. This is undoubtedly a weak point in the design of our ships.[150]

And yet, for much of the interwar period, it was the same 1909-1911 classes of capital ships that formed the backbone of the Mediterranean Fleet.[151] Concern over the material deficiency of British capital ships was heightened even more after the experience of Jutland. In an effort to determine what improvements could be made in future warship construction based on its most recent experience, a committee was formed within the 2nd Battle Cruiser Squadron. Its initial findings included the revelation that:

> British battle cruisers, whether in service or about to be commissioned, are unequal to

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and Armour, 1993), p. 200.

[150]Correlli Barnett, The Swordbearers: Supreme Command in the First World War (Bloomington: Indiana University Press, 1963), p. 116.

[151]The ships of the 1909 programme were decommissioned as follows: the battleships HMS Hercules, Orion, HMS Monarch, Conqueror, and the battle cruiser Lion in 1923; the battleship Thunderer in 1926, and the battleship HMS Colossus in 1929. The battleships King George V and Ajax of the 1910 programme were disposed of in 1926 whilst the battleship Centurion was converted to a target ship in 1926. Of the 1911 programme, the battleships Marlborough and Emperor of India and the battle cruiser Tiger were paid off in 1931 as a result of the London Treaty of 1930 and scrapped whilst the battleships Benbow and Iron Duke, decommissioned since 1928, were scrapped and de-militarised.

> the duties assigned to them, as their protection is insufficient to enable them to encounter the capital ships of the enemy without incurring undue risk of destruction.[152]

It is academic whether the battle cruisers of the 1921 programme would have been similarly disadvantaged. What remains is that the Washington Agreement ensured the retention of at least two battle cruisers beyond their real operational effectiveness.[153]

The legal requirement to eliminate surplus capital ships also had unintended consequences. The development of the Mobile Naval Base Depot Organisation, the Royal Navy and the Royal Marine tactical formation for developing and operating an advanced base, suffered for want of a proper depot ship. The Washington Agreement precluded the planned use of HMS Agincourt[154] and funds to construct a specialised ship were never forthcoming.[155] Finally, one last defect of the Five Power Treaty and its successors, the London Naval Treaties of 1930 and 1936, was that they rested on the assumption that the terms of the accords would be followed by the contracting parties. The intelligence means to verify compliance were lacking, and the necessary

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[152]2nd Battle Cruiser Squadron memorandum No. 527d. dated 23 June 1916, 'Interim Report of Committee on Construction,' in Beatty Papers, BTY/7/17/4.

[153]Namely, Repulse and Renown. Both ships were also disadvantaged in that their main armament was limited to six 15-inch guns. To be sure, both ships were modernised during the period and saw service in World War II. Their retention owed much to the fact that they mounted 15-inch naval rifles.

[154]Commissioned 1914, armed with fourteen 12-inch guns, and of 31,000 tons displacement.

[155]ADM 1/9037/114/1936, First Sea Lord undated and un-numbered minute, 'Naval Construction Programme 1936,' to the Board of Admiralty; see also ADM 116/2149, Naval Section table regarding 'British Capital Ships,' dated 13 December 1921 which identifies Agincourt as a Mobile Naval Base Ship.

cooperation in securing inspection of naval dockyards and warships was not always forthcoming.[156] Thus, at the Second London Naval Conference whilst the British were pressing hard for the adoption of the 14-inch gun as a new treaty maximum, the Japanese were already proceeding quietly with plans to build battleships of a more radical nature in the Yamato-class.[157] To this end, by 1931 Japan had test fired

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[156]In July 1937 the Director of Plans developed a formula for estimating the true displacement of a warship based on solving the products of length, beam, and draught and comparing the results with known figures for British ships. Inexact as it was, it indicated that German and Italian warships were larger than their declared displacements. See F.H. Hinsley, British Intelligence in the Second World War, Its Influence on Strategy and Operations, Volume I (London: HMSO, 1979). p. 506. Recent assessments of the Admiralty's intelligence capabilities include Joseph A Maiolo, "'I believe the Hun is cheating': British Admiralty Technical Intelligence and the German Navy, 1936-39," Intelligence and National Security, Volume 11, No. 1, January 1996, pp. 32-58 and Donald Cameron Watt, 'British Intelligence and the Coming of the Second World War in Europe,' in Ernest R. May, ed., Knowing One's Enemies: Intelligence Assessment Before the Two World Wars (Princeton: Princeton University Press, 1984).

[157]A former Assistant Naval Attaché to Japan, George Ross, relates the following account: 'I called on Captain Tom Troubridge, our Naval Attaché, and a number of Germans whom I had met through Alice [Ross' German born wife]. I then called the Japanese Embassy where I knew the Naval Attachés, Captain Kojima and Commander Yamamoto. They invited me to lunch and a motor tour of the city, including the new Olympic Stadium. Quite unexpectedly they talked about the new gigantic battleships being built secretly. These were the YAMATO and MUSASHI. Displacing over 64,000 tons, they carried a main armament of nine 18-inch guns. They were heavily armoured and had huge bulges at the waterline to protect them against torpedoes. It was indeed exciting and unexpected news which I passed to Tom Troubridge as soon as I could see him again. Kojima must have thought I was already aware of the new ships. It was news to the British Admiralty.' Whilst this writer can accept Ross' claim to have been told that the Japanese Navy was building new capital ships, given the Naval Staff decision to adopt the 14-inch guns in the King George V-class, it must be doubted whether Ross was advised of the true details of such ships. See 'Unpublished Memoirs,' pp. 299-300, Engineer Rear Admiral George Campbell Ross Papers, Imperial War Museum, London, IWM/86/60/1.

the 18.1-inch gun and initiated detailed design work of that class in 1934. Indeed, such was the degree of secrecy surrounding HIJMS Yamato[158] and her sisters that the first European to view the ships, the German naval attaché to Japan, only did so in October 1942.[159]

Turning to the question of the Service's finance in the interwar period, it is undoubtedly the case that Britain failed to allocate sufficient funds to the Royal Navy to allow it to meet the minimalist goal of operating at the 'One Power Standard'.[160] Whether one looks at her deficiency in ammunition stocks, the lack of fuel which curtailed high speed steaming, the reduction in naval pay that fostered the 'Invergordon Mutiny,' or the Keyes' example of sacrificing a capital ship to find the necessary personnel to man minesweepers, one is left with the impression of a Service struggling to meet its responsibilities. Indeed, of the legal constraints presented by the several treaties and the fiscal constraints demanded by the Treasury, the requirements of the latter were always the more pressing. Thus, when laying up the ships required under the Washington Agreement, the Mobilisation Branch of the Admiralty could report that:

> The first stage in the scrapping of Capital Ships, i.e. de-storing and de-ammunitioning will, it is anticipated, be completed by 31st May. This expedition has been dictated, not so much by considerations of the Washington Treaty, as by the forthcoming early discharge of Naval

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[158]Commissioned 1941, armed with nine 18.1-inch guns, and of 65,000 tons displacement.

[159]Malcolm Muir, Jr., 'Rearming in a Vacuum: United States Navy Intelligence and the Japanese Capital Ship Threat, 1936-1945,' The Journal of Military History, Volume 54, Number 4, October 1990, pp. 473-485.

[160]The Fourth Sea Lord in un-numbered minute to Chief of the Naval Staff dated 27 September 1928 observed that 'The One Power standard is not being maintained in the active Fleet.' See ADM 1/8737/97.

Ratings.[161]

The manning of the fleet was tied to Vote A of the Naval Estimates, and, here as elsewhere, reductions for the sake of economy were evident. It has already been remarked that the peacetime complement for capital ships was substantially below the levels required for active service. Less obvious, perhaps, is that the reductions in manning influenced, albeit indirectly, the development of battlefleet tactics during the period. In 1930, a committee chaired by Rear Admiral C. M. Forbes[162] was charged with investigating the manning to support the signalling and wireless establishments aboard capital ships--an issue of concern to the Admiralty as some argued that a private ship must have the same communications capabilities as a flagship. By limiting a heavy ship's signals establishment, an unintented consequence was that it restricted the ability of capital ships to operate in a decentralised manner.[163]

Previous studies of the interwar Royal Navy have commented on the strict financial climate that the Service faced, yet have offered little direct evidence upon which to measure its actual import from an operational perspective. Viewed together, Appendix III,[164] Appendix

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[161]ADM 1/8623/66, Mobilisation Branch un-numbered minute dated 10 April 1922.

[162]Later Admiral of the Fleet Sir Charles Morton Forbes (1880-1960); Flag Commander, Iron Duke (1915-1916); Commander, Mediterranean Fleet Destroyer Flotillas (1930-1931); Third Sea Lord and Controller (1933); Vice Admiral, First Battle Squadron (1934); Commander-in-Chief, Home Fleet (1938-1940); and Commander-in-Chief, Portsmouth (1941-1943).

[163]See ADM 1/8740/69, 'Report of W/T and V/S Organisation Committee 1930.'

[164]Appendix III reflects the geographic areas where the Royal Navy either was engaged in active operations or deployed forces in the anticipation of becoming engaged in active operations.

IV,[165] and Appendix V[166] of this study provide an indication of how the steady reduction in the period's Naval Estimates influenced the operations of the Service as measured by visits of capital ships to friendly states. The years 1928 and 1929 are particularly noteworthy. These were times of relative tranquility, and yet the Service's routine of 'showing the flag' with its heavy ships was at a standstill due to underfunding.

That said, the fact remains that the Navy fared better than the British Army and the Royal Air Force in securing funds from the Treasury.[167] Reflecting on the financial cuts of the period and their impact, Admiral of the Fleet Sir Henry Oliver[168] recalled that:

> Gibraltar had suffered much from post war economy and the garrison had been cut to the bone and everything was in a very bad state, guns batteries etc. and there was only one weak infantry battalion and not half the R.A. and R.E. necessary, it might have been a Portuguese fortress from its

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[165]Appendix IV recounts Royal Navy operations involving capital ships.

[166]Appendix V does not consider the visits of the Mediterranean, Atlantic, or Home Fleets to ports routinely visited on the Mediterranean Station.

[167]Given the dual control exercised by the Royal Navy and the Royal Air Force over the Fleet Air Arm, this was not necessarily for the best. For example, whilst the Admiralty had identified a requirement for six squadrons of aircraft for fleet support in 1922-1923, the practical result of the Geddes Committee proposal to limit the Air Estimates to £10,000,000 would have limited the air force to fielding only two squadrons for naval support. See 'Appendix III, Memorandum by the Admiralty, Prepared for Mr. Churchill's Committee, Relations between the Air and the Navy,' dated 6 February 1922, ADM 1/8653/265.

[168]Admiral of the Fleet Sir Henry Francis Oliver (1865-1965); Director of Naval Intelligence (1913); Deputy Chief of the Naval Staff (1917); Rear Admiral, First Battle Cruiser Squadron (1918); Commander-in-Chief, Home Fleet (1919); Second Sea Lord (1920-1924); Commander-in-Chief, Atlantic Fleet (1924-1927); retired (1933).

appearance.[169]

While accepting the severe financial pressures at work, one must question whether the Service spent wisely what funds were allotted to it. As an example, in March 1932, Field, the First Sea Lord, thought the need to reintroduce sailing ships for cadet training so pressing that he was prepared to place either HMS Malaya[170] or Valiant in reserve to pay for this enterprise.[171] In the event, Field's proposal came to nought as Chatfield cancelled the initiative upon assuming the post of First Sea Lord, yet the fact remains that while the Service was faced with strict economies, it was slow to rationalise the number of yachts in commission and continued to upgrade the accommodations afforded to flag officers afloat. Indeed, even with rearmament finally gathering pace, the Admiralty proceeded in 1938 with plans to provide a new Royal Yacht at an estimated cost of £825,000.[172]

Still, such savings were on the margins, and the funds simply did not exist to cover all of the Service's unfunded requirements. Thus, at a conference held at the Admiralty in November 1920 to address the Navy's air requirements:

> It was stated that an Aircraft Carrier cost in the neighbourhood of four millions. The C.in-C. Atlantic Fleet had asked that 9 or 11 might be supplied to meet Naval needs, which number he considered an essential requirement; that is to say he considered that a large Aircraft Carrier Fleet was required. The Admiralty had been unable to

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[169]From 'Recollections, Volume II', p. 262, Admiral of the Fleet Sir Henry Francis Oliver Papers, National Maritime Museum, Greenwich, NMM/OLV/12. R.A. and R.E. refer to Royal Artillery and Royal Engineers, respectively.

[170]Commissioned 1916; details as per Warspite.

[171]Field memorandum to Board of Admiralty dated 12 March 1932 and 'Minutes of Meeting of Sea Lords and A.C.N.S. Tuesday, 15th March 1932', Chatfield Papers, NMM/CHT/3/3.

[172]Anthony Carew, The Lower Deck of the Royal Navy 1900-39: The Invergordon Mutiny in Perspective (Manchester: Manchester University Press, 1981), p. 174.

> accept this number for financial reasons and had decided on five instead of eleven as a minimum aim of the moment.[173]

Certainly, in 1920 it was by no means clear that the aircraft carrier would assume the position of prominence that it later did, and therefore, reasons other than fiscal existed for proceeding with a degree of caution in any programme adopted. This will be addressed more fully during the discussion of the period's naval operations and tactical development. Let it be remarked, now, that at the very conference cited previously, the possibilities of employing parasite aircraft with airships or of using a forerunner of a wing-in-ground effect aircraft with the fleet were two potential technologies that stood in direct competition with the aircraft carrier.[174]

In the end, the need for economy and the desirability of naval arms control became a self-perpetuating process. Having demanded savings in the Naval Estimates, the Government, with the Service's active support, pursued legal limitations with its rivals as a means of limiting its future naval requirements. With each new agreement, the Treasury posed the question whether additional economies were not now possible. The size of the Royal Navy at the end of the Great War allowed the British to reduce its maritime forces to a level adequate to meet its needs and minimise any demand for new construction, yet only for a time. Beatty's arguments to Lloyd George about the deleterious effects a naval building holiday would have

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[173]ADM 1/8602/53, Report of Conference held on 29 November 1920.

[174]Ibid. The United States Air Force experimented with parasite aircraft as a fighter escort for its B-36 strategic bomber in the 1950's whilst the Soviet Union developed two classes of wing-in-ground effect aircraft, the Utka and the Orlan, for naval purposes during the 1980's. See Understanding Soviet Naval Developments (Washington: Chief of Naval Operations, 1991), pp. 77-78.

were, in the end, more than proven correct. And surely, it is also the case that the British pursued economy to an inordinate degree. Accepting that it had a substantial level of debt arising from the 1914-1918 war, was it appropriate to reduce naval construction in the 1920-1930 period to the extent that, for much of that period, the French, who had no less of a war debt[175] and substantial military obligations, were actually outbuilding the Royal Navy as measured by tonnage?[176]

Finally, the reduction in the number of heavy ships operated by the Royal Navy, whether caused by fiscal pressure or by treaty agreement, meant that the opportunity for many a promising mid-level or senior officer to serve in a capital ship was unavailable. In a Service where the path to higher command was very much tied to one's experience and development afloat, the only solution on offer that seemed to permit the evaluation of the greatest number of officers was to reduce the time in command in battleships and battle cruisers.[177] It was an unsatisfactory state of affairs and clearly recognised as such, moving Admiral Field to write:

> I am quite sure that the greatest obstacle to full efficiency in the present-day Navy is caused by the numerous and frequent changes of officers. I am fully aware of the requirements for specialisation and how difficult it is to maintain the

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[175]By war's end, The United Kingdom owed the United States $4,200,000,000 whilst France owed the United Kingdom £600,000,000 and the United States $3,000,000,000. See J. M. Winter, The Experience of World War I (New York: Oxford University Press, 1989), p. 216.

[176]See ADM 1/8748/139 for a comparison of the British, French, and Italian navies postwar construction levels.

[177]Indicative of this trend, Benbow had eleven captains between 1919-1929, Marlborough had ten commanding officers during the same period whilst Emperor of India had an equal number including three in 1921. See ADM 1/8776/146 and Viscount Cunningham, A Sailor's Odyssey: The Autobiography of Admiral of the Fleet Viscount Cunningham of Hyndhope (London: Hutchinson, 1951), p. 147.

balance between technical training and ship efficiency, but I consider that, in reaching any decision which involves a reduction in the number of officers serving in the most important units of the Fleet, it is essential that the necessity for the reduced complements being fully efficient should be stressed most strongly. Officers in battleships and cruisers should therefore, as far as possible, commission and pay off their ships and should never be changed until they have completed at least twelve months in a ship.[178]

Field's concerns were, in the end, not unjustified, and there are a host of reasons why the disturbances in the Atlantic Fleet commonly known as the 'Invergordon Mutiny' transpired. Yet, even allowing for the issues of pay and allowances, for the shortcomings in the methods of naval discipline, or for the effects of political agitation cited by contemporary observers, the fact remains that the bonds between officers and ratings had been weakened.[179] This was particularly the case in the capital ships with their large crews, lack of meaningful operational employment, and strict social hierarchy. There is a direct link between the fiscal stringency and naval arms control agreements of the interwar period, and their culminating point for the Royal Navy was at Invergordon. One contemporary officer serving in Nelson attempting to find a silver lining, observed that:

> These have been paralysing days - impossible to believe. The whole future now seems in jeopardy; long after this business is settled its memory will remain & affect the whole disposition of the fleet & its activity. The only bright spot is the powerful weapon it places in the Admiralty's hands in future when governments might hastily propose mucking about with the

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[178]ADM 1/8762/265, Commander-in-Chief, Mediterranean letter No. 236/678/65. dated 12 February 1930.

[179]J. M. Kenworthy, The Real Navy (London: Hutchinson & Co., 1932) provides one such sympathetic treatment of the Invergordon Mutiny.

Navy...[180]

One recent study has concluded that financially and operationally, the Royal Navy was in a much better state during the initial interwar period (1919-1929) than is commonly accepted and that its troubles became manifest only in the middle part of the 1930's.[181] In the end, this writer cannot accept Ferris' conclusions, as he fails to grasp that the strength afforded by seapower is a strength built on a long-term political commitment and a corresponding financial investment. The fact that Britain was not challenged on the seas during the 1920's meant that she enjoyed her supremacy by default and lived off the fruits of an investment made during the Great War. The treaties she entered into were a symptom of this under-investment and not the cause. Indeed, it is the present writer's view that no aspect of interwar naval policy can be sufficiently understood without reference to the Service's financial plight. Still, for the Royal Navy, it remains that the capital ship was influenced by factors other than legal and financial including strategic, operational, and tactical considerations. How these additional influences altered the concept and design of the capital ship during the period under investigation form the balance of this study.

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[180]Diary entry dated 16 September 1931, Captain Arthur Dyce Duckworth Papers, Imperial War Museum, London, IWM/76/207.

[181]See John Ferris, "'It is Our Business in the Navy to Command the Seas': The Last Decade of British Maritime Supremacy, 1919-1929," in Keith Nielson and Greg Kennedy, eds., Far Flung Lines: Studies in Imperial Defence in of Honour Donald Mackenzie Schurman (London: Frank Cass, 1997).

PART II

CHAPTER III

THE EVOLUTION OF NAVAL WEAPONRY AND THE CAPITAL SHIP: THE OFFENCE, THE DEFENCE, AND THE THREAT

> Some officers say the battleship is more alive than ever; others declare that the battleship is dead. I regarded the surface battleship as dead before the War, and I think her more dead now, if that is possible.[1]
>
> Admiral Sir Percy Scott

> Our faith in aircraft is gradually diminishing, a flying boat today had to descend owing to engine trouble & had to be towed back by a destroyer, & frequent complaints are made about their inefficiency in passing information. Clearly, Sir Percy Scott's time is not yet, when battleships shall be driven off the seas by numberless airplanes.[2]
>
> Midshipman Henry A. King

Any discussion regarding the efficacy of the capital ship within the Royal Navy during the era must take account of the many technological developments and then assess their influence on the offensive and defensive capabilities of battleships and battle cruisers. Moreover, the improvements witnessed in military and naval technology benefited not only the capital ship, but also its rivals. This chapter, then, investigates the steps taken to ensure the survivability of the capital ship, the material measures taken to increase its offensive effectiveness, and the corresponding evolution in the threats that it faced.

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[1]Percy Scott, Fifty Years in the Royal Navy (London: John Murray, 1919), p. 332.

[2]Journal entry dated 29 June 1922, King Papers, IWM/90/23/1.

It is vital to remember that while many contemporaries, not least members of the Treasury, may have judged the relative strengths of navies by merely counting the number of capital ships, such vessels formed but two types of warships, albeit the most prominent ones. Thus it was not necessary for heavy ships to deal directly with all the myriad threats they might face, if supporting units, including aircraft, were likely to be present.[3] Similarly, the offensive capabilities of the capital ship did not stand in isolation, but formed a part of the overall offensive potential of the fleet. For example, some naval actions, such as in-shore operations in support of military forces or anti-submarine warfare operations, were better left to other naval vessels based on considerations of suitability, risk, and time. It will be left to future chapters to discuss the doctrine, operational employment, and tactical precepts of the Royal Navy during the interwar era. For now, a discussion of the technical characteristics of the capital ship and a review of the active measures taken to ensure its continued survivability is required.[4]

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[3]Thus, in the knowledge that a primary function of light cruisers was to defend the battle line, the Fire Control Requirement Committee of 1919 recommended that a smaller gun (i.e., less than a 6-inch mount) be adopted as the secondary armament in capital ships. See 'Final Report of the Fire Control Requirement Committee,' ADM 116/2068.

[4]This chapter can offer only a summation of the technical issues in extant, but a basic understanding is required prior to entertaining a discussion of battlefleet tactics. The secondary literature is extensive. Norman Friedman, Battleship: Design and Development 1905-1945 (Greenwich: Conway Maritime Press, 1978), though it primarily addresses the U.S. Navy, remains the standard work on the technical trade-offs in capital warship design during the period. Its assessment of the Royal Navy is hindered by a failure to consult operational and tactical, as opposed to technical, source material. Alan Raven and John Roberts, British Battleships of World War Two: The Development and Technical History of the Royal Navy's Battleships and Battlecruisers from 1911 to 1946 (London: Arms and Armour Press, 1976) offers the best single source

The Distinctions in Royal Navy Capital Ships. During the interwar period, the term 'capital ship' was a generic reference applied to two distinct types of warship: the battleship and the battle cruiser. As a result of the Five Power Treaty, a legal definition of the capital ship was codified, and, thus, from 1925-1930, the Royal Navy restricted usage of the phrase 'capital ship' in its official writings and adopted, instead, the term 'heavy ship'.[5] In the main, it can be said that the two classes of warships shared similarities in offensive striking power, though the battleship often carried an extra mount in its main armament.[6] However, whereas the battleship placed a premium on providing adequate armour protection over its vital components, the battle cruiser sacrificed a measure of passive protection and relied, instead, on speed to evade a stronger adversary. The emphasis on speed, rather than armour and total offensive power, certainly still resulted in ships of very large dimensions. Hood, for example, was in the interwar period the largest vessel in the Royal Navy with a displacement greater than 42,000 tons and a length of 860 feet, whilst Tiger had been the Service's heaviest ship of the 1914-1918 war.[7]

Following the Washington Naval Treaty, a legal

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discussion on the characteristics of British capital ships on the eve of the 1939-1945 war.

[5]'Admiralty Fleet Order 3358.--British Warships--Classification.' dated 4 December 1925 and 'Admiralty Fleet Order 3131.--Capital Ships--Use of the Term.' dated 5 December 1930, ADM 1/8753/230.

[6]Compare for example, the main armament of Dreadnought (ten 12-inch guns in five mounts) to its contemporary the Invincible-class battle cruisers' arrangement (eight 12-inch guns in four mounts) or the even more limited arrangement found in Repulse and Renown.

[7]John Roberts, Anatomy of the Ship: The Battlecruiser Hood (London: Conway Maritime Press, 1982), p. 12.

definition was reached that a capital ship was any warship exceeding 10,000 tons displacement and mounting guns greater than 8 inches. As Britain was, in the main, scrupulous in following the terms of the era's naval treaties, the legal definition and the operational definition of what constituted a capital ship were for her the same. This was not always the case, and the role envisioned for the pocket battleships of Germany, in truth large-gunned cruisers, meant that whilst these ships met the legal definition of a capital ship, operationally they did not.

Returning to the battle cruiser, the weight saved by minimising its armour was partially accounted for by increasing the machinery in its engineering spaces, and, partly, in providing a vessel of greater length. Whilst the increase in length made for a faster and more fuel-efficient warship, it resulted, conversely, in a more vulnerable ship as adequate armour protection could not be provided along the entire length of the hull.[8] The battle cruiser is perhaps the perfect example of how the theories formulated in peacetime were found wanting by the test of war, and the recent experience of the Royal Navy confirmed that the battle cruiser's design assumptions were spurious.[9]

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[8]It is a rule of naval engineering that due to the properties of fluid dynamics, for two ships of a given displacement and other factors being equal, the longer ship will require an engineering plant of less horsepower to achieve a given speed.

[9]Campbell in Jutland argues that while its losses can be attributed to a lack of protection, the real cause was the nature of British charges and the measures taken for preventing the flash of ignited propellant reaching the magazines. It is significant, though, that Royal Navy battleships did not suffer correspondingly similar casualties, and that Hood, long after steps had been taken to reduce the peril of flash from charges reaching the magazine, was lost in short order in its engagement with Bismarck and Prinz Eugen in May 1941. In truth, it was recognised that all warships were vulnerable at given ranges, and the calculation of this vulnerability directly determined the fleet tactics adopted.

It can certainly be argued that battle cruisers were not originally envisioned as forming a part of the battleline per se, but were designed to engage light cruisers and ensure that the scouting and reconnaissance requirements of the battlefleet were met.[10] That the original emphasis was on the cruiser aspects of the class is highlighted by the fact that Royal Navy battle cruisers were equipped initially with hydrophones to facilitate submarine detection, something that the Service's battleships never employed.[11] Therefore, to the extent that its operational employment was at variance with its original conception, reflects rather more adversely on the practioners of naval art than on its architects. Yet, it remains that following the commissioning of Hood in 1920, the Royal Navy was to complete no further warships of this type.

The Offensive Characteristics of Battleships and Battle Cruisers. Whilst the primary striking power of Royal Navy battleships and battle cruisers must of necessity be considered its main armament, the naval rifle, it was not unusual for British capital ships of the period to also embark multi-purpose aircraft capable of conducting independent strike operations. Moreover, a torpedo complement was a significant feature of the capital ships of the Service. For the Royal Navy, therefore, the capital ship soon became the ideal platform upon which to integrate not only the new offensive means of naval warfare, but also the improved versions of older arms. In time, the torpedo armament of some ships was reduced, repositioned, or eliminated, and the trend was confirmed when the second King George V-class was commissioned with no torpedo complement at all.[12] A discussion of the specific offensive

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[10]On the military rationale for the battle cruiser see, ADM 1/8586/70, 'C.B. 01557.'

[11]ADM 186/172, 'C.B. 1654, Armament of His Majesty's Ships' dated 1924, p. 9.

[12]Burt, British Battleships of World War One, p. 265.

attributes of the capital ship follows.

Main Armament. In the interwar period, various calibres of main armament guns were in use, ranging from the 12-inch, 45-calibre rifles of Dreadnought, the first all-big gun warship, to the 16-inch, 45-calibre guns of the Nelson-class of battleships.[13] The arrangement of the main armament for capital ships varied significantly, but eventually the turrets were arranged along the ship's centreline. Likewise, the number of turrets, and the number of rifles associated with each turret, were not constant. Arrangements varied from the most common, a dual mount in five turrets, to the quadruple mounting scheme employed in the latter King George V-class. In the main, as the calibre of the gun became larger, the number of turrets present became fewer as considerations of weight became more pronounced. While the advantages of placing the turrets along the centreline were obvious, the engineering required for super-mounted turrets was considerable, and the first classes of Royal Navy capital ships had turrets fore and aft as well as batteries located midships offset from the centreline.[14] Finally, to reduce wear on rifling of the main guns and to minimise relining, a 6-pdr gun was provided for each rifle to allow for sub-

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[13]It is recognised that the Royal Navy did adopt the 18-inch gun in HMS Furious, styled as a 'large light cruiser' and in the monitors HMS Lord Clive and HMS General Wolfe. Yet, as Furious was taken in hand for conversion in the war to operate aircraft, and in due course, lost its main armament, it lies outside the scope of this work. Likewise, this work does not address monitors as their limited operational role precludes their consideration as a capital ship.

[14]The introduction of the super-firing turret brought with it the problems of increased concentration in weight which could compromise a ship's sea-keeping abilities. See Burt, British Battleships for a discussion on the design of HMS Neptune. Moreover, turrets disposed in wing formation allowed for more guns to be trained fore and aft--an important consideration for engagements fought on other than parallel lines.

calibre firing.[15]

In many respects, the aim in designing a capital ship was to secure the best possible balance between offensive striking power, passive defensive protection, displacement, speed, range, manning, and the final arbiter--cost.[16] In this regard, the unique arrangement of the Nelson-class' main armament was a direct result of the displacement restrictions of the Washington Naval Treaty.[17] Similarly, the number of guns housed in a turret was a compromise which balanced the risks of sacrificing the least number of guns through the loss of a turret and considerations of minimising the weight required for protection. Indeed, a debate existed amongst serving officers on just these very matters, and one writer observed:

> with ships of large beam it is possible, and far more economical in weight, to install triple turrets. Hence the Rodney and Nelson were given three triple turrets, which provided 9 guns at less weight than would have been needed for 8 in twin turrets. With no restriction on size, however, it is desirable to give a capital ship one turret beyond the strict minimum, to allow for casualties. This leads to the conclusion that the ideal main armament should comprise 12 guns carried in four turrets.[18]

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[15]ADM 186/172, 'C.B. 1654,' pp. 2-9.

[16]'finance is the principal factor governing the size of a Navy' quoted from the Admiralty paper 'Imperial Naval Defence' of 1919, Dewar Papers, NMM/DEW/4.

[17]The arrangement of the turrets for Nelson and Rodney where the entire main armament was located forward of the superstructure was unique for British capital ships, but it was not the only example. The French Navy employed a somewhat similar scheme in the Dunkerque and Richlieu-classes of capital ships constructed during the period.

[18]'Major', 'The Size of Capital Ships' Naval Review, Vol. XXIV, 1936, pp. 251-256. Certainly, Royal Navy capital ships never did adopt the ideal arrangement referred to by 'Major' though the second King George V-class was originally designed to carry twelve main guns to be housed in two quadruple mounts and two dual mounts. In the Montana's, a follow-on to the Iowa-class battleships, the United States Navy did design a capital ship that

Still, other factors applied, and the teething problems of new gunnery arrangements should not be discounted. Commenting on the triple turrets of Nelson, Pound,[19] then serving as the Assistant Chief of the Naval Staff, wrote to Keyes, the Commander-in-Chief, Mediterranean that:

> The tonnage of the capital ships may have to be put up a bit as triple turrets of Nelson have not proved altogether satisfactory on trials and I think it quite likely that in the future we shall have to go back to 4 twin turrets, which means additional weight both for mountings and necessary increase in length of the ship.[20]

The naval rifles of capital ships were only as good as the shells and charges they fired, and in the Great War those of the Royal Navy were found wanting. The story of the performance of British naval artillery during the late war exposed at the Battle of Jutland has been treated elsewhere and lies outside the scope of this work.[21] Suffice it to say that at Jutland only the battleship Revenge[22] was able to penetrate the heavy armour of a German

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conformed to the ideal discussed by 'Major'. See John C. Reilly, Operational Experience of Fast Battleships; World War II, Korea, Vietnam (Washington: Naval Historical Center, 1989) p. viii.

[19]Later Admiral of the Fleet Alfred Dudley Pickman Rogers Pound (1877-1943); Flag Captain Colossus (1916); Commanding Officer, Repulse (1920-1922); Director of Plans (1922-1925); Assistant Chief of the Naval Staff (1927-1927); Commander, Battle Cruiser Squadron (1929-1931); Second Sea Lord (1932-1935); Commander-in-Chief, Mediterranean (1936-1939); First Sea Lord (1939-1943); and Chairman, British Chiefs of Staff Committee (1940-1942).

[20]Halpern, ed., Keyes Papers, Volume II, p. 221.

[21]For treatment of the Royal Navy's shell problem see Lord Chatfield, The Navy and Defence: The Autobiography of Admiral of the Fleet Lord Chatfield (London: William Hineman, Ltd., 1942), pp. 151-157 and Anthony Pollen, The Great Gunnery Scandal: The Mystery of Jutland (London: Collins, 1980).

[22]Commissioned 1916; details as per Royal Sovereign.

capital ship, that of the battle cruiser SMS Derfflinger,[23] and to achieve a successful detonation by a major calibre shell.[24]

Yet the problem cannot be dismissed out-of-hand. Certainly, once the problem was identified, the Admiralty and the Grand Fleet took steps to correct the situation. As no further fleet actions took place after the Jutland engagement, the efficacy of these steps taken cannot be proven. However, if one accepts Chatfield's assertions that the shell problem had been resolved by the middle of 1918, it must also be admitted that problems with naval gunnery persisted throughout the interwar period, when the question is viewed in toto. As late as June 1922, the battleship Barham experienced numerous misfires in its main 15-inch battery during gunnery exercises,[25] whilst the problems previously noted by Admiral Pound in Nelson's main armament were still evident in May 1934 when a sustained fire demonstration was held.[26]

Finally, it must be borne in mind that the guns of a capital ship could be no better than the crews which served them, and reductions and changes in a ship's company meant that regular schedules of training were required to maintain the fighting efficiency of a ship's weapons.

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[23]Commissioned 1914, armed with eight 12-inch guns, and of 26,000 tons displacement.

[24]Campbell, Jutland, p. 222-224.

[25]See Journal entry dated 22 June 1922 for the experience of Barham, in King Papers, IWM/90/23/1. For a similar account regarding the battle cruiser New Zealand see the diary of John S. Hammill, entries dated 14 and 15 July 1919, Captain John S. Hammill Papers, Imperial War Museum, London, IWM/92/18/1. On the mechanical problems associated with the 13.5-inch guns of Marlborough during gunnery exercises see entry for 30 July 1920 in the Midshipman Journal of Renfrew Gotto, Captain Renfrew Gotto Papers, Imperial War Museum, London, IWM 83/55/1.

[26]ADM 186/328, 'C.B. 3001/35, Progress in Naval Gunnery, 1935 Edition,' Admiralty, Naval Staff, Training and Staff Duties Division dated March 1935, pp. 100-101.

During the 1914-1918 war, the manning in capital ships had been increased. In peacetime, in the face of financial constraint, it was perhaps natural that manning problems would arise as officers and ratings engaged for hostilities were released from naval service. The potential seriousness of the problem is illustrated by the example of Centurion, a battleship of the first King George V-class. When in April 1923 the ship exercised its main armament Midshipman Geoffrey Lambert recorded that:

> We went to General Quarters at 0915 and prepared for the C-in-C's shoot. As we are only 3/5th complement we only use 'A' 'B' & 'X' turrets if the 4" gun crews happen to be closed up at the same time; they are made up of 'Q' & 'Y' turrets crews.[27]

Moreover, one argument amongst several for adopting a uniform secondary armament in capital ships was to reduce the manning levels required to fight the ship.[28] The Service was continually faced with the need to minimise its manning levels in all classes of warships, particularly in capital ships. In March 1925, a committee chaired by Admiral Sir William Goodenough[29] investigated the issue in depth and recommended that the number of control positions in heavy ships be reduced, that a greater reliance be placed on employing ratings engaged for short service, and that the complements for crew served weapons be reduced by a fixed percentage.[30] These conclusions met with vehement opposition from both the Director of the Gunnery Division and the Director of Naval Operations. They issued a joint

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[27]Journal entry dated 16 April 1923, Lambert Papers, IWM/90/19/1.

[28]ADM 116/2068, 'Final Report of the Fire Control Requirement Committee.'

[29]Admiral Sir William Edmund Goodenough (1867-1945). Rear Admiral, Second Battle Squadron (1916-1918); Commander-in-Chief, Africa Station (1920-1922); Vice Admiral, Commanding Reserve Fleet (1923-1924); Commander-in-Chief, the Nore (1924-1927); and retired (1930).

[30]ADM 116/2284, Report of the Manning Committee.

rebuttal that drew attention to the fact that British heavy ships were already undermanned when compared to their Japanese counterparts.[31] In so far as the cost of manpower, approaching 30%, was the greatest single expense borne in Naval Estimates, the issue was never far from the fore in the Service's negotiations with the Treasury.[32] A report circulated in 1936 recommended reducing the number of commissioned officers (particularly lieutenants) on surface combatants, and relying more heavily on senior ratings to perform duties once the preserve of officers.[33]

As for the ammunition employed in the main armament of Royal Navy capital ships, it consisted primarily of four types of shells: armour piercing, capped (APC); common pointed capped (CPC); nose fused high explosive (HE), and shrapnel.[34] Additionally, a nominal number of practice rounds were carried. Filled with an inert agent such as sand, sawdust, loam, or pitch they were designed to have the same ballistic characteristics of service ammunition.[35] For a battleship of the Nelson-class, typically, ten

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[31]See ADM 116/2284, Joint Report from the Director of Gunnery Division and Director of Operations.

[32]See ADM 116/2282, 'Summary of War Fleet in 1925 Estimates.'

[33]See report of 'Peace and War Complement Committee 1935-1936,' Admiral Sir Thomas Hugh Binney Papers, Imperial War Museum, London, PP/MCR/95. The report, written against the backdrop of Japan's war in China and the possibility of deploying additional British forces to the theatre, offers insight into the operational implications of the manning issue. No reductions were envisioned in the officer manning of the carrier force save for the loss of one lieutenant in HMS Hermes whilst the manning of the Mediterranean Fleet, the immediate strategic reserve, was favoured over the Home Fleet.

[34]ADM 186/364, 'B.R. 154, Ammunition Pocket Book, 1935,' Admiralty, Naval Staff, Gunnery Branch dated 27 February 1935, p. 15.

[35]ADM 116/2090, Admiralty Fleet Order '976.--Practice Projectiles--New Methods of Weighting,' dated 1 November 1920.

practice rounds were carried for each of the 16-inch naval rifles.[36] The amount and type of ammunition actually embarked varied, but APC, the ship-killing shells for attacking opposing capital ships, predominated. In 1919, it was the rule that battleships were supplied with 100% APC shell whilst battle cruisers embarked shell in the proportion of 80% APC and 20% CPC.[37] The difference in fit between the two types of heavy ships was because APC was of little value against lightly armoured warships, and battle cruisers could be expected to meet light forces in the course of carrying out their scouting and reconnaissance functions.[38] Eventually, an adjustable time fuse set for non-delay was perfected that allowed APC to be used against light craft with a reasonable chance of success.[39]

During the war, a battleship of the Queen Elizabeth-class carried about 800 shells and associated charges for its main armament, or in other words, about 100 rounds per gun,[40] whilst a battle cruiser carried 120 rounds.[41] This had not always been the case; at the start of the Great War, 80 rounds per heavy gun had been the norm,[42] and it was

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[36]See figure titled 'H.M.S. RODNEY. ARCS of GUNFIRE.' in Journal, Beaufoy-Brown Papers, LHCMA.

[37]ADM 186/244, 'C.B. 1561, Progress in Gunnery Materiél, 1920,' Admiralty, Naval Staff, Gunnery Branch dated July 1920, p. 46.

[38]Ibid.

[39]ADM 186/293, 'C.B. 3001/28, Progress in Naval Gunnery, 1928,' Admiralty, Naval Staff, Training and Staff Duties Division dated March 1929, pp. 85-86.

[40]Jon Tetsuro Sumida, 'British Naval Operational Logistics, 1914-1918,' The Journal of Military History, Volume 57, Number 3, July 1993, p. 455.

[41]ADM 1/8586/70, 'C.B. 01557.'

[42]Ibid.

with this number that Nelson and Rodney were armed.[43] At Jutland, at least, the battleships of the Queen Elizabeth and Royal Sovereign-classes had not carried HE rounds as these were carried by lesser gunned warships.[44] As the older 12-inch, 13.5-inch, and 14-inch gunned capital ships were paid off the requirement for 15-inch armed capital ships to carry HE shells arose, although it was not always met. During the interregnum an acute shortage of HE rounds for 15-inch guns was noted at the time of the Turkish crisis of 1926;[45] a situation which had still not appreciably improved nine years later at the time of the Abyssinian crisis, when a shortage of high explosive ammunition was discovered for both 15-inch and 16-inch guns. In fact, in late 1935 the Royal Navy's entire stock of high explosive rounds for 16-inch guns was only 50 shells.[46]

Any discussion about the range of a capital ship's main armament must be prefaced with the comment that the theoretical maximum ranges specified represented the ideal; actual ranges obtained in wartime were always likely to be much less. There are many reasons why this was so, but the problems associated with visibility, both natural and that generated by battle, and the rudimentary means of fire control available were no doubt two of the greatest

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[43]David Brown, ed., The Design and Construction of British Warships 1939-1945 (London: Conway Maritime Press, 1995), p. 25. Beaufoy-Brown specifies the number of rounds carried as 100. The variance between what could be carried and what was carried while small can be attributed to considerations of weight and cost.

[44]Campbell, Jutland, p. 345.

[45]See Commander-in-Chief, Mediterranean assessment in Halpern, ed., Keyes Papers, Volume II, p. 169.

[46]See Admiral Roger Backhouse Note to Chatfield dated 4 September 1935, Chatfield Papers, NMM/CHT/4/1.

limitations.[47] No example better illustrates how bad visibility could be than the Battle of Jutland. Visibility in the North Sea was rarely good, and when compounded by the smoke produced by the Grand Fleet and the German High Sea Fleet steaming at speed it was absolutely dismal. As Chalmers has written, 'Owing to low visibility, no two commanders got the same view of the action, and although 250 ships took part, there were never more than three or four enemy capital ships in sight at the same time from any point in the British line.'[48]

The range of naval gunnery was also limited by such considerations as the wearing of the guns' rifling from previous firings,[49] the type of shell fired and its corresponding shape, the charge employed, the maximum elevation allowed by the turret's guns, and the prevailing meteorological conditions. Still, if the general tendency had been for the fielding of ever larger guns, checked only by considerations of cost and naval arms limitations agreements on capital ships, the value of greater range

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[47]The question of naval fire control exercised some of the best minds in the Navy including Admiral Scott, Admiral Sir Frederic Dreyer, and Chatfield; it also piqued the interest of the gifted civilian Arthur Hungerford Pollen. In claiming that the instruments of the day were rudimentary, the author does not wish to imply that they were simple. On the contrary, they were for their time, examples of the most sophisticated of technology. Still, as they depended on light for observation, they suffered a weakness that was only remedied by the application of new means: radar.

[48]W. S. Chalmers, The Life and Letters of David, Earl Beatty (London: Hodder and Stoughton, 1951), p. 265.

[49]The life expectancy of a 15-inch gun was about 335 full calibre, full charge firings before relining was required. See Roskill, Warspite, p. 89. An improvement over the 12-inch, calibre 50 naval rifle which needed relining following 130 full charge firings. See Friedman, Battleship, p. 129.

was, at times, open to question.[50] One Chief of Naval Staff could write to a Commander-in-Chief of the China Station that:

> I am also considering the elevation of the guns of those...ships so that we shall have at least 7 eventually that will be able to fire the same ranges as the Americans and Japanese, for what firing at those ranges is worth, and with aircraft spotting one never knows.[51]

A sentiment it can be said that was shared by another Flag Officer, Admiral Sir Walter Cowan,[52] who commented that:

> For years we have demonstrated that we can't hit often at anything over 10,000 yds to make it worthwhile going on with it--look at Monarch firing--all day long at a sitting target & only 5 hits from the might of the British Navy. Year by year we fritter away what little ammunition they allow us by a lot of long range experiments instead of trying to perfect ourselves by good fire discipline at effective ranges & thereby "blooding the pack" & giving them something to look at in the way of wrecked targets flying aloft in splinters.[53]

Hood's main armament had been designed to elevate to

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[50]Admiral Sir John Fisher had pressed for the development of the 20-inch gun. See Fisher letter to Commodore Charles de Bartolome dated 18 April 1916, Arthur J. Marder, ed., Fear God and Dread Nought: Volume III, Restoration, Abdication, and Last Years, 1914-1920 (London: Jonathan Cape, 1959), p. 340.

[51]Chatfield letter dated 11 May 1934 to Vice Admiral Sir Frederic Dreyer, Chatfield Papers, NMM/CHT/4/4.

[52]Admiral Sir Walter Henry Cowan (1871-1956). Commanding Officer, Princess Royal (1915-1917); Commander, Baltic Force (1919); Commander, Battle Cruiser Squadron (1921-1922); Commander-in-Chief, America and West Indies Station (1926-1928); and retired (1931).

[53]Cowan letter to Keyes dated 26 November 1926 in Halpern, ed., Keyes Papers, Volume II, p. 194. Monarch was used as a target for gunnery and bombing trials on 20 January 1925 after being paid off as a result of the Five Power Treaty. See Parkes, British Battleships, p. 528.

a maximum of 30°[54] and the Nelson-class to 40°, though the maximum elevation initially attained by earlier heavy ships was more restricted.[55] The maximum elevation attainable in the primary armament of Dreadnought was 13.5°,[56] while the Royal Sovereign, Repulse, and Queen Elizabeth-classes were initially limited to 20°.[57] Thus, during the period under review, modifications were made in the main armament to allow for the increased training in turret elevation.[58]

The 12-inch guns of Dreadnought had a listed range of 18,850 yards firing a shell weighing about 850 lbs.[59] Given that the exchanges at Jutland were at times in excess of 20,000 yards, it must be admitted that even by 1916 Dreadnought was a capital ship in name only. In contrast, the 16-inch guns of the Nelson-class, the Royal Navy's sole experience with 16-inch armed battleships, had a range in excess of 37,000 yards firing a shell of 2,375 lbs.,[60] whilst the 14-inch guns of the King George V-class could fire a shell weighing 1,590 lbs. to 36,000 yards.[61] However, two considerations every bit as important as the range of a capital ship's main armament were the weight of

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[54]Diagram between entries 7 and 8 May 1921, Elkins Journal, Elkins Papers, NMM/ELK/1.

[55]'H.M.S. RODNEY. ARCS OF GUNFIRE.' Journal, Beaufoy-Brown Papers, LHCMA.

[56]Roberts, Battleship Dreadnought, p. 29.

[57]ADM 186/317, 'C.B. 1915, Anti-Aircraft Defence. Summary of the Report of the Naval A.A. Gunnery Committee, 1931,' Admiralty, Naval Staff, Training and Staff Duties Division dated October 1933, Plate No. 6.

[58]The ships eventually modified included Renown, Queen Elizabeth, Valiant, Warspite.

[59]Roberts, Battleship Dreadnought, p. 29.

[60]Robert Gardiner, ed., The Eclipse of the Big Gun: The Warship 1906-45 (Annapolis: Naval Institute Press, 1992), p. 174. Parkes in British Battleships credits the weight of shell for the 16-inch gun as 2,461-lbs.

[61]Parkes, British Battleships, p. 666.

broadside that could be delivered and the rate of fire that could be sustained.[62] Chatfield could justify the reduction in the planned main armament configuration of the King George V-class from twelve to ten 14-inch guns based on the higher rate of fire he believed the Royal Navy enjoyed over its rivals. Writing to Winston Churchill, he explained:

> By this change 800 tons were saved to increase the armour and the underwater protection. Thus greater safety was given the Class against their being destroyed by a lucky shell or by a mine before getting into battle. The loss of 2 guns could be made up by the increased loading efficiency of British seamen.[63]

Campbell credits the Germans with being able to fire three rounds a minute per gun for their 11 and 12-inch armed ships, while the British could manage about two rounds a minute per gun during the late war.[64] These figures are in keeping with the maximum rates of loading.[65] This is not the same as the maximum rate of fire under combat conditions where the target range, bearing, inclination, and deflection had to be recalculated prior to each shoot. In short, as ranges grew the maximum rate of fire was reduced as the control period increased due to the

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[62]Broadside firing by a ship, except during a night engagement when ranges were closer, was atypical and guns were usually fired in a salvo of one gun from each turret. This minimised the time that the opposing vessel was not under fire, allowed the degree of correction for fall of shot to be reduced, minimised ballistic interference between guns of the same turret, and reduced hydraulic strain.

[63]Chatfield letter to Churchill dated 10 March 1942, NMM/CHT/7/3.

[64]Campbell, Jutland, p. 345.

[65] In trials at HMS Excellent, the 38cm guns of Baden were fired and loaded in 23 seconds; the corresponding time for the 15-inch guns in HMS Queen Elizabeth was 36 seconds. See ADM 186/251, 'C.B. 1594, Progress in Gunnery Material, 1921,' Admiralty, Naval Staff, Gunnery Branch, p. 42.

salvo's longer time of flight.[66] Charles Drage records that in one exercise Renown fired a pair of salvos in 22 seconds.[67] In fact, the degree of variation between ships of even the same class was so striking that a generalized statement concerning heavy ships' rates of fire is meaningless. Based on the recorded results of battle practices for 13.5 and 15-inch gunned ships, a vessel that approached firing one round per gun per minute was near the optimum, but a more typical rate was about one round per gun every 90 seconds.[68] The Admiralty, for its part, sought a rate of fire of three salvos per minute in a 15-inch gun ship.[69] Dreadnought's weight of broadside of eight guns was 6,840 lbs. whilst a Nelson-class ship could deliver a broadside of 21,375 lbs. with its nine heavy guns.[70] Indicative of the importance attached to building survivable ships late in the interwar era within the constraints of international agreements, the second King George V-class actually delivered less weight of broadside than the Nelson-class. The ten 14-inch guns of a King George V-class ship fired a total weight of shell equal to 15,900 lbs.

In light of the previous discussion, then, the exact lethality of a capital ship's primary armament is not

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[66]ADM 186/338, 'C.B. 3001/36, Progress in Naval Gunnery, 1936,' Admiralty, Naval Staff, Training and Staff Duties Division dated June 1936, p. 12.

[67]Midshipman Journal of Charles Drage, entry dated 20 October 1926, Commander Charles Hardinge Drage Papers, Imperial War Museum, London, IWM/DH/2/3/82.

[68]ADM 1/8658/69, 'Appendix I. Average target practice results, 1921 and 1922. 15" and 13·5" ships at "QUEEN ELIZABETH" at 60^0 inclination.'

[69]ADM 186/339, 'C.B. 3001/1914-36, Summary of Progress in Naval Gunnery, 1914-1936,' Admiralty, Naval Staff, Training and Staff Duties Division dated December 1936, p. 49.

[70]Mounting ten 12-inch guns, the broadside of Dreadnought was restricted to eight guns due to their placement.

readily quantifiable. Certainly, they demonstrated an ability to sink ships, but it is more appropriate to enquire how effective they were in doing this.[71] The experience of the late war had demonstrated that whilst shooting could be spirited, few hits were actually obtained in relation to the quantity of ordnance expended,[72] a fact noted by Chatfield when he commented that:

> The large number of rounds fired to hits obtained, both by the Germans and ourselves, proved the difficulty of engaging when both the firing ship and the enemy were steaming at speed. The movement of the ship, the vibration, the reduced visibility due to smoke and spray, all made not only finding the initial range, but still more, keeping on the target once the range was determined a matter of the utmost difficulty.[73]

Numerous tests were conducted to determine not only the survivability of the surface ship, but the presumed killing power of capital ships. These included the August 1921 firings against the ex-German battleship Baden[74] by the

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[71]As fleet action was rare in the Great War, the number of engagements involving Royal Navy capital ships was limited. At the Battle of the Falklands, the German armoured cruisers SMS Scharnhorst and SMS Gneisenau succumbed to battle cruisers whilst in the Dogger Bank action, SMS Blucher, too, fell prey to British battle cruisers. At Jutland, the only High Sea Fleet capital ships lost were the battle cruiser SMS Lutzow and the pre-dreadnought SMS Pommern.

[72]Liddell Hart records that at the Falkland Islands encounter less than 5% of the rounds expended by British battle cruisers achieved hits whilst at Jutland only 2.2% of the heavy shells struck home. The Dogger Bank engagement resulted in hits of about 1% for the Royal Navy. See 'Naval Notes 1933', 11/1933/47, LHCMA.

[73]Chatfield, Navy and Defence, p. 160.

[74]Commissioned 1916; details as per Derfflinger. Baden was also used in 1921 as a test ship to measure the effectiveness of aerial bombing. See ADM 116/2089, Air Ministry letter S.13077/S.6 to Admiralty dated 5 December 1921.

monitor HMS Terror,[75] the 1922 shoot by Barham, Hood, Warspite, and Valiant against the former German cruiser Nürnberg,[76] and the June 1931 tests against the Emperor of India by Iron Duke.[77] The Baden test was aimed at ensuring that the defects in armour piercing shells noted during the war had been resolved.[78] It must be noted, however, that a common problem facing such demonstrations was that they never replicated conditions likely to be found on active service. The test against Nürnberg is a case in point. While the range at which she was engaged varied from 28,000 yards by Hood to 18,000 yards by Barham and Warspite, when she was attacked by destroyers firing torpedoes, Nürnberg was being towed at a mere four knots by Repulse.[79]

The Service measured the presumed destructiveness of its armament based on a mathematical expression which combined the variables of shell diameter with the rate of fire of the specific gun mount. Thus, the 'destructive effect of shells varies approximately as D^4, where D represents the diameter.'[80] Based on the above rule, the basic destructiveness of Royal Navy capital ship main armament, where the value of the 16-inch shell is 100, could be calculated as:

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[75]ADM 186/251, 'C.B. 1594' and ADM 186/259, 'C.B. 1640, Progress in Gunnery Material, 1922 and 1923,' Admiralty, Naval Staff, Gunnery Branch (G. 0470/23).

[76]ADM 186/258, 'C.B. 962, Progress in Naval Gunnery, 1922,' Admiralty, Naval Staff, Gunnery Division dated April 1923.

[77]ADM 186/309, 'C.B. 3001/31, Progress in Naval Gunnery, 1931,' Admiralty, Naval Staff, Training and Staff Duties Division dated April 1932, p. 17.

[78]Roskill, Naval Policy, Volume I, p. 249.

[79]Journal entry dated 7 July 1922, King Papers, IWM/90/23/1.

[80]ADM 1/8685/152, Appendix B, 'The Fighting Quality of Cruisers,' Admiralty minute P.D. 02171/25 dated 6 March 1925.

Shell	Destructive Effect
12-inch	32
13.5-inch	51
14-inch	59
15-inch	77
16-inch	100

When the above figures are adjusted to account for the greatest number of guns able to be trained, the figures become:

Class of Ship	Relative Destructive Power
Dreadnought (8X12)	165,888
Invincible[81] (6X12)	124,416
Bellerophon (8X12)	165,888
St. Vincent (8X12)	165,888
Neptune (10X12)	207,360
Colossus (10X12)	207,360
Indefatigable (8X12)	165,888
Orion (10X13.5)	332,151
Lion (8X13.5)	265,720
King George V (1912) (10X13.5)	332,151
Erin (10X13.5)	332,151
Canada (10X14)	384,160
Iron Duke (10X13.5)	332,151
Agincourt (14X12)	290,304
Tiger (8X13.5)	265,720
Queen Elizabeth (8X15)	405,000
Royal Sovereign (8X15)	405,000
Renown (6X15)	303,750
Hood (8X15)	405,000
Nelson (9X16)	589,824
King George V (1939) (10X14)	384,160

It can therefore be seen that the decision to adopt the 14-inch gun represented a significant reduction in the offensive potential of the King George V-class battleship compared to the 16-inch armed battleship, and to a lesser extent, the 15-inch armed capital ship. Although there are

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[81]Though it was possible for 'P' and 'Q' turrets to fire across the deck, the resulting blast was so severe that it was proscribed except during an emergency. See Commanding Officer, Invincible letter No. A1/4 Commander-in-Chief, South Atlantic and South Pacific dated 18 December 1914, Milford Haven Papers, IWM/DS/MISC/9.

many considerations and compromises in the construction of a warship, the British decision to adopt the 14-inch gun was certainly one of the most questionable of the period, particularly when bearing in mind that the offensive potential of the Royal Navy was already severely compromised with the retention of Repulse and Renown with their limited striking power.[82] Chatfield justified the adoption of the 14-inch gun with the observation that:

> we were satisfied that our 14-inch gun ships were in all respects a match for any 15 inch ships of the same displacement such as Germany and Italy were laying down, and could also be better defended on a 35,000 tons displacement against underwater and air attack.[83]

Of course, a fleet action was not the only instance when the main battery of a battleship or battle cruiser could be employed. Bombardment in support of military operations has been a recurring mission for surface warships and practice shoots against targets ashore were a feature of gunnery exercises. Centurion held such a practice at Malta in November 1923 when ten rounds, full calibre charge, were fired by 'X' and 'Y' turrets, and when it appeared that close support might have to be provided to British Army units operating in the Dardanelles in 1922 a naval fire control party was landed to liaise with signallers of the Highland Light Infantry, an ashore naval battery, Centurion, and the accompanying cruiser HMS

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[82]It could be argued that the decision to decommission the Iron Duke-class and retain the Repulse-class was mistaken. Moreover, Repulse and Renown, with only six main guns, were disadvantaged in spotting the fall of their shots during salvo firing. See Raven and Roberts, British Battleships, p. 47. As offensive gun power is but one attribute in the equation of warship effectiveness such a conclusion would be premature.

[83]Chatfield letter to First Lord dated 16 March 1940, Chatfield Papers, NMM/CHT/6/4.

Ceres.[84] In the main, though, the Royal Navy exercised its main guns during the era in preparation for fleet action,[85] and when the occasion did arise for capital ships to support inshore operations, such as when Marlborough engaged Turkish Nationalist forces in the summer of 1920, it was the 6-inch guns of its secondary armament that were used to back up the landings carried out by the Royal Marines.[86]

Secondary Armament. The secondary armament mounted in capital ships varied considerably during the period and reflects most clearly the evolving nature of what was viewed as the primary threat to battleships and battle cruisers. The ammunition outfit for secondary armament consisted of five types of shells: semi armour piercing, capped (SAPC) for use against armour of medium thickness; common pointed ballistic cap (CPBC) for use against armour; semi armour piercing (SAP) for use against armour; CPC for use against unarmoured ships; and common pointed (CP).[87] While the main armament of a capital ship represented a heavy ship's maximum offensive potential, the secondary armament was employed in more limited offensive and defensive roles. Again, the evolution of naval engineering improved the layout and performance of secondary armament over the course of the interwar era. Whilst the improvements noted in the main armament of capital ships were essentially on the margins such as improving the mountings to allow for the increased elevation of the guns thus affording greater range, the modifications made in secondary armament frequently resulted in a wholesale

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[84]See Journal entries dated 6 November 1922 and 3 January 1923, Lambert Papers, IWM/90/19/1.

[85]ADM 186/117, 'C.B. 3042, Manual of Combined Operations, 1938,' Admiralty, Naval Staff, Training and Staff Duties Division dated December 1939, p. 59.

[86]See Journal entry dated 6 July 1920, Gotto Papers, IWM/83/55/1.

[87]ADM 186/364, 'B.R. 154,' p. 15.

change to a ship's configuration.[88] The placing of the secondary armament in the first generation of dreadnought type heavy ships had been on the roofs of the main turrets and in the superstructure proper.[89] In such a position, the widest possible arcs of fire were provided, but the crews were subject to the effects of blast from the main guns.[90] In time, as the calibre of gun in the secondary armament became larger, and, thus heavier, they were located in casements beneath the ship's main deck and along the beam.[91] In such a disposition they afforded the ship little or no protection from air attack.

An example of how extensive the changes made in the secondary armament could be is offered by Chatfield in a letter written to Admiral Sir William Fisher,[92] the Commander-in-Chief, Mediterranean:

> In the "WARSPITE" I am taking out four 6-inch guns, removing the 6-inch battery armour, and putting it on the engines and boiler rooms, re-engining and reboilering the ships, doubling the number of 4-inch guns, fitting 4 Mark M Pom Poms, and a catapult on the boat deck with Observation and 2 Fighting Aircraft.
>
> In the other ships I intend to remove the 6-inch batteries altogether and substitute the 4.7 inch twin mountings, 8

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[88]The conversion of Furious and the 'large light cruisers' HMS Courageous and HMS Glorious to aircraft carriers did change their main armament. In 1924, Courageous and Glorious were stripped of their four 15-inch guns mounted in twin turrets. Yet, with their conversion they ceased to exist in the role originally conceived for them and became a new class of warship.

[89]Friedman, Battleship, p. 135.

[90]Ibid.

[91]Ibid.

[92]Admiral Sir William Wordsworth Fisher (1875-1937). Commanding Officer, St. Vincent (1916); Rear Admiral, First Battle Squadron (1924-1925); Director of Naval Intelligence (1926); Fourth Sea Lord (1927-1928); Commander-in-Chief, Mediterranean (1932-1935); Commander-in-Chief, Portsmouth (1936-1937).

> guns aside, H.A. and L.A. This mounting will not be ready for the "WARSPITE"[93]

The actual secondary armament found varied from 4-inch to 6-inch mounts, with the 6-inch mounts of the older ships gradually losing favour to be replaced by a smaller weapon which was typically dual purpose and afforded a greater rate of fire--an important consideration as the threat from the air grew in prominence.[94] Likewise, the number of secondary guns carried varied with each class of capital ship, and it must be pointed out that as ships underwent refit not only did the type of secondary armament change, but so too, frequently, did the numbers carried. Indomitable and Inflexible of the Invincible-class battle cruisers mounted twelve 4-inch, calibre 45 guns, in a mixture of open air and semi-enclosed mounts as its secondary armament and were capable of firing twelve rounds per minute each,[95] while the later King George V-class went to sea with sixteen 5.25-inch guns in eight protected turrets capable of firing eighteen rounds per minute each.[96] The number of rounds carried for the secondary armament varied, but HMS Royal Oak's[97] establishment was 130 rounds for each of its fourteen 6-inch, calibre 45 guns,[98] while the Nelson-class carried around 150 operational and 24

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[93]Chatfield to Fisher letter dated 2 August 1934, Chatfield Papers, NMM/CHT/4/5. The other ships referred to were Queen Elizabeth, Valiant, and Renown. H.A. and L.A. refer to High Angle and Low Angle anti-aircraft guns.

[94]Dual purpose secondary armament incorporated both an anti-air and anti-surface capability. The secondary armament in Dreadnought was unique in that it consisted of 12-pounder guns.

[95]Burt, British Battleships, pp. 39-58.

[96]Middlebrook and Mahoney, Battleship, p. 34.

[97]Commissioned 1916; details as per Royal Sovereign.

[98]ADM 1/9244, 'Statement of Dimensions', Royal Oak.

practice rounds for each of its 6-inch guns.[99] The maximum elevation attainable varied from 60° for the Nelson-class to 30° for Hood and the Repulse-class, and 15° for the Queen Elizabeth and Royal Sovereign-classes.[100]

One important shell not found in a capital ship's main armament was the star shell. Used for target illumination during operations at night, secondary batteries with their higher rates of fire could illuminate a target up to 9,000 yards away and maintain the pattern without detracting from a ship's main offensive weapon.[101] Developed after the Battle of Jutland, star shells allowed an adversary to be highlighted without necessarily giving away the position of the firing ship, as was apt to happen when high-powered searchlights were employed.[102] The star shell, itself, was a time-fused pyrotechnic fired at a high angle which released a parachute-deployed magnesium flare.[103] During the period, a flashless star shell was perfected that masked the firing ship.[104] Searchlights were however retained for use when cloud cover was low and star shells were unable to illuminate surface targets. In turn, searchlights suffered when it was raining[105] or the range was in excess of 6,000

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[99]See figure titled 'H.M.S. RODNEY. ARCS of GUNFIRE' in Journal, Beaufoy-Brown Papers, LHCMA.

[100]ADM 186/317, 'C.B. 1915,' Plate No. 6.

[101]ADM 1/8766/43, unnumbered and undated minute regarding exchange of gunnery information with the United States Navy.

[102]Hezlet, Electron and Sea Power, p. 153. At Jutland, the cruisers HMS Southampton and HMS Dublin received extensive damage after illuminating German ships with searchlights.

[103]Studholme Brownrigg, 'Gunnery in the Royal Navy,' Reginald Bacon, ed., Britain's Glorious Navy (London: Odhams Press, Ltd., n.d., but c. 1942), p. 222.

[104]ADM 186/318, 'C.B. 3001/32, Progress in Naval Gunnery, 1932,' Admiralty, Naval Staff, Training and Staff Duties Division April 1933, p. 7.

[105]Bacon, ed., Glorious Navy, p. 222.

yards and illumination proved difficult.[106] During the 1920's, a ship of the Queen Elizabeth-class carried about 200 star shells for use by her 6-inch and 4-inch guns.[107]

Another shell unique to the secondary armament was the target smoke burst. Fired at altitude to simulate an attack by a high level bomber,[108] the smoke burst was a less than adequate target for a ship's high angle anti-aircraft weapons.[109] Finally, mention must be made of the gas shell. Developed on an experimental basis for naval use against submarines during the 1914-1918 war,[110] the fielding of a chemical shell by the Royal Navy during the period is an issue of some doubt.[111] The Service recognised that it was being developed by other naval forces, including the United States Navy.[112] Its anticipated use was as an anti-personnel weapon to be fired at control and gunnery positions during ship engagements[113] and in breaking up exposed military

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[106]Journal entry dated 29 September 1921, King Papers, IWM 90/23/1.

[107]ADM 1/9266, 'Statement of Dimensions,' for Queen Elizabeth following her 1926 reconstruction.

[108]ADM 186/258, 'C.B. 962,' p. 21.

[109]Smoke shell for screening an amphibious assault or a flotilla attack against an enemy fleet whilst developed was, for safety reasons, not embarked during peace time. See ADM 186/244, 'C.B. 1561,' p. 51.

[110]ADM 116/1775, First Sea Lord minute to Cabinet dated 7 May 1920.

[111]See Appendix VI.

[112]See ADM 1/8586/70, 'Final Report of the Post-War Questions Committee,' dated 27 March 1920, p. 101. The 1940 edition of its naval ratings' handbook includes a table identifying the distinctive colour patterns of naval shells in use including gas. See The Bluejackets' Manual United States Navy (Annapolis: Naval Institute Press, 1940), pp. 524-525.

[113]ADM 116/2068, Director of Naval Ordnance un-numbered minute dated 24 April 1920.

formations during a shore bombardment.[114]

Tertiary Armament. Rapid fire light weapons for dealing with aircraft or unprotected surface targets were fitted to heavy ships, and the specific types in use were to undergo much change throughout the period. In 1922, all capital ships except Centurion were equipped with two 3-inch guns and four 3-pdr guns each.[115] The 3-inch guns were provided for defence against aircraft whilst the 3-pdr guns were employed for ceremonial saluting purposes.[116] Eventually, the 4-inch gun was adopted as the standard anti-aircraft armament in British heavy ships and a complement of four per ship was provided.[117] An exception to the above was the use of the six 4.7-inch anti-aircraft guns provided in the Nelson-class which were capable of elevating to 60^0.[118] By 1930, the multi-barrel Mk. VI M Pom-pom[119] was the Service's primary short range air defence weapon being fitted to capital ships; an eight barrel mount fired 720 rounds per minute for up to two minutes using a shell fused to burst on impact.[120] Maxim, and then, Lewis guns were also fitted to heavy ships for close range anti-aircraft fire,[121] and by 1933 the standard fit was for 10 Lewis guns in anti-aircraft mountings.[122] The effectiveness of such anti-aircraft weaponry depended on reaching a

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[114]ADM 1/8586/70, 'C.B. 01557.'

[115]ADM 186/59, 'C.B. 1534, British Navy, Part I, Battleships and Battle Cruisers, September 1922, pp. 4-22.

[116]Ibid.

[117]ADM 186/317, 'C.B. 1915,' Plate No. 6.

[118]Ibid.

[119]The 40mm, calibre 40 pom-pom was commonly identified as the 2-pdr. See Friedman, Battleship, p. 115.

[120]Bacon, ed., Glorious Navy, p. 223.

[121]Parkes, British Battleships, p. 494.

[122]ADM 186/317, 'C.B. 1915,' Plate. No. 6.

satisfactory firing solution that brought an aeroplane under accurate and sustained fire at the earliest possible moment. Unfortunately, the fire control system developed by the Royal Navy did not measure an aircraft's course, so much as guess it, with a consequence that the system was inadequate for its task.[123] Perfecting an anti-aircraft fire control system was complicated as, unlike a system designed to calculate surface gunfire, it had to track a target in three dimensions. Commenting on the difficulties of high angle anti-aircraft control, Humphrey Madden, a midshipman serving in Repulse, recorded that:

> H.A. control is by far the most difficult control, because the control officer has to deal in three dimensions.
>
> He can spot easily for vertical & horizontal deflection, - as it does not have to be so accurate as in 15" firing - but he cannot tell, unless there is a direct hit, once he is on for line, whether the shots are bursting short or beyond the target. It looked as if all our shots were bursting near the smoke shell - once we were on for line - but from the marking party in the tug, they were seen to be several thousand yards short.[124]

Torpedo Armament on Royal Navy Capital Ships. All classes of Royal Navy capital ships during the period were initially armed with torpedoes save for the second King George V-class of battleships. Controversy surrounded the continued retention of a torpedo armament on Royal Navy capital ships and the matter was soon addressed by both Fire Control Requirement and Post-War Questions Committees in 1919. The argument against their retention was that their use by capital ships had been minimal during the war, and that they sometimes required separate facilities for

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[123]Geoffrey Till, 'Impact of Airpower on the Royal Navy in the 1920's,' University of London, unpublished Ph. D. Dissertation, 1976, p. 68.

[124]Humphrey Madden Midshipman Journal entry dated 6 July 1925, Admiral of the Fleet Sir Charles Madden Papers, National Maritime Museum, Greenwich, NMM/MDN/3.

plotting and controlling, and, hence, additional naval personnel.[125] Moreover, the firing of torpedoes from heavy ships was rarely as satisfactory as their firing from cruisers and destroyers, and the problems associated with their use by heavy ships resulted in special trials being carried out in 1927 by Malaya and Queen Elizabeth.[126] Finally, the tactical conditions under which the weapon could be employed were at variance with long range gunnery requirements. Commenting on the differing tactical requirements Tennyson-D'Eyncourt noted:

> It may be assumed that the gun is the primary weapon of a Capital Ship: therefore do away with torpedo tubes (except possibly 1 or 2 for the moral effect, or for use in case of a special emergency). The argument for this is that it is undesirable to have two totally different weapons of offence requiring different tactics for the best use of them, the projectile reaching its objective in a few seconds and that of the other taking perhaps a half an hour. The possibility of using either or both of these in an action is only likely to confuse the mental attitude of those in command and cannot make for the greatest efficiency.[127]

Additionally, when located beneath the waterline, they weakened a ship's armoured belt, but if located topside, torpedoes were liable to cause a sympathetic explosion if struck by shell-fire. Experiments were conducted on the latter point, and the risk was thought minimal, though as with most assessments regarding the torpedo and the capital ship, this verdict was not universally shared.[128] Tennyson-D'Eyncourt, for one, objected strongly to the practice and

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[125]ADM 116/2068, 'Final Report of Fire Control Requirement Committee.'

[126]ADM 189/47, 'C.B. 1770(27), Annual Report of Torpedo School, 1927' pp. 26-29.

[127]ADM 1/9225, Director of Naval Construction minute CSecO 1214/19 dated 3 July 1919.

[128]'Remarks on the Final Report of the Post-War Question Committee of Capital Ships,' Phillimore Papers, IWM 66/9/1.

wrote:

> A number of torpedo tubes on the upper deck constitutes...a grave danger to the ship from direct hit, the result of which might easily cripple or destroy the ship.[129]

Of course, the reason that torpedoes had migrated to an above the waterline mounting was that as the maximum speed at which capital ships could operate increased, they proved difficult to fire when located on the beam from a submerged flat.[130] Moreover, the fitting of anti-torpedo bulges, such as in Repulse, hindered the firing of torpedoes from a submerged flat.[131] In Nelson and Rodney, this limitation was mimimised by placing the tubes in the bow where they were aligned to fire ahead.[132] Finally, a drawback of the above-water torpedo tubes of the Royal Sovereign-class was that, unlike those located in a submerged flat, they could not be reloaded at sea.[133]

During the war it was customary for capital ships to embark five torpedoes for each of its submerged tubes,[134] yet the trend in the postwar period was for their elimination during successive refits as a part of battleship's armament though they continued to be carried by battle cruisers.

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[129]ADM 1/9225, Director of Naval Construction minute CSecO 1214/19 dated 3 July 1919.

[130]ADM 116/2068, 'Final Report of Fire Control Committee.' A drawback that presumably did not apply to Hood as she was able to discharge her submerged flat torpedoes whilst steaming at speed. See enclosure (10) to Vice Admiral, Special Service Squadron letter No. 235/32/1/4 to Admiralty dated 5 August 1924, ADM 116/2256.

[131]ADM 189/42, 'C.B. 1638, Annual Report of Torpedo School, 1922,' p. 113.

[132]Friedman, Battleship, p. 152.

[133]See report of 'Peace and War Complements Committee 1935-1936,' Binney Papers, IWM/PP/MCR/95.

[134]ADM 1/8615/200, 'Basis on which Reserves of Torpedoes for various types of vessels was decided,' un-numbered minute dated 20 October 1921.

The number of tubes carried could be as few as two, such as found on the Lion-class of battle cruisers and the Nelson-class of battleships, to as many as ten as employed in Repulse.[135] Still, Nelson and Rodney carried fourteen torpedoes for their two tubes,[136] the Queen Elizabeth-class carried twenty for their four tubes,[137] and Repulse embarked a total of 26 torpedoes.[138] This represented a significant reload capability for a weapon for which, by common assessment, little use had been found in the late war by heavy ships.[139]

The size of the torpedo was not a constant, either, and ranged from a minimum of 14-inches, as found in the small picket boats embarked aboard the Dreadnought, Invincible, Bellerophon, St. Vincent, Neptune, Indefatigable, Colossus, Orion, and Lion-classes, to the 24½-inch tubes of the Nelson-class.[140] The maximum range of the 21-inch torpedo, armed with a 500 lbs. warhead of TNT or Amatol, was between 15,000-18,000 yards, depending

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[135]'A FEW DETAILS OF H.M. BATTLE CRUISER "REPULSE"', Admiral Sir Gerald Dickens Papers, Imperial War Museum, London, IWM/90/35/2.

[136]ADM 1/8694/12, 'Basis of Reserve Torpedoes,' unnumbered and undated minute.

[137]ADM 1/9258, 'Statement of Dimensions,' dated 17 February 1925 for Warspite.

[138]'A FEW DETAILS OF H.M. BATTLE CRUISER "REPULSE"', Dickens Papers, IWM/90/35/2.

[139]Clouding the issue further was the 'torpedo carrier,' a warship armed with a very heavy torpedo battery mounting upwards of fifty tubes for delivering a barrage against the enemy battle line. Madden discounted the concept and argued for the adequate provision of destroyer flotillas or an aircraft carrier armed with torpedo planes. See 'Final Report of the Fire Control Requirement Committee' and Commander-in-Chief, Atlantic Fleet letter A.H.242/28 dated 23 November 1920, ADM 116/2068.

[140]Parkes, British Battleships, pp. 477-533.

on the specific Mark.[141] The 24½-inch torpedo found in Nelson and Rodney carried a 750-lbs. charge to a range of 20,000 yards.[142] In exercises, a charge composed of cork and water, or cork and oil, was used.[143] This facilitated recovery of what was during the period the most expensive naval weapon in use. The settings for range, speed, and angle could be adjusted prior to firing.[144]

Plotting: The Correlation of the Offence and the Defence. The tactical rationale of the capital ship was its superior offensive potential when measured against other surface warships. Yet, the firepower of an individual capital ship was not an end in itself, unless it had been detached for independent operations, but formed part of the overall offensive potential of the fleet. The means of ranging, concentrating, and delivering the firepower of the ship or of the battlefleet was through a coordinated process known as fire control which served a specific tactical purpose. The use of the fleet's scouting and reconnaissance forces, the availability of any strategic intelligence on enemy fleet movements, the collation of tactical signals intelligence, and the movement of the fleet's battle squadrons had the aim of maximising the total firepower available at the moment the fleet deployed from its cruising formation to its battle formation in anticipation of a fleet action, and then of delivering the greatest concentration of fire. The requirements of fire control and the requirements of manoeuvre necessitated that

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[141]ADM 186/403, 'C.B. 523, Handbook for R.N.T.F. Torpedoes. 18-inch Marks VII to VII**** 21-inch Marks II. to IV*, 1918,' p. 10.

[142]ADM 189/47, 'C.B. 1770(27),' p. 6.

[143]Diagram 'Collision Head,' Beaufoy-Brown Journal, Beaufoy-Brown Papers, LHCMA and King Journal, IWM 90/23/1 entry dated 13 September 1921.

[144]Midshipman Journal entries for 25 and 27 May 1926, Midshipman J. Waldron Papers, Imperial War Museum, London, IWM/86/59/1.

a plot should be kept. Though of a similar nature, the two requirements were not identical, and two separate plots were maintained by flagships and senior officers of independent formations.[145] Thus, plotting served two distinct purposes: strategical and tactical.[146] Whilst the need for plotting had been recognised in the Grand Fleet, there had not been a single prescribed method developed for individual ships or squadrons during the war.[147] In part, this was due to space and personnel constraints, and one benefit of a larger ship was that plotting arrangements were enhanced.[148]

In an age when computers and computing have pervaded so much of the fabric of everyday life, the difficulty of analyzing and then plotting in a manual form the information reports received from so many disparate sources, with varying degrees of accuracy, may not be readily appreciated. Grenfell captured the essence and the difficulties of plotting when he observed that:

> The detailed examination of any tactical problem, whether involving torpedo attacks, tactical minefields, gunnery concentration, or movements of fleets, is very largely a matter of plotting. Anyone who has plotted out even a comparatively straightforward problem of plain manoeuvring will know what a very lengthy and laborious process such an

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[145]The two plots were variably called strategical and tactical, general and action, and primary and secondary. Confidential Admiralty Monthly Order, C.M.O. 890 issued November 1920 standardized on the terms strategical and tactical. See ADM 116/2090.

[146]Royal Navy writings of the period address the subject in terms of strategic and tactical plotting; modern naval doctrine discusses the issue in terms of the intelligence requirements of the operational and tactical levels of war. The author is aware of this distinction but retains the original construct as most contemporary references are to strategical plotting.

[147]ADM 116/2090, Royal Naval Staff College to Director, Training and Staff Duites letter dated January 1920.

[148]ADM 116/1673, Grand Fleet Orders (Revised 1917).

investigation is.[149]

In addition to the information provided by the screening forces (i.e., destroyer flotillas, cruisers, and submarines) information on enemy fleet movements could be received by long range aircraft patrols, the organic reconnaissance aircraft of the fleet, fleet tactical signals intelligence received through onboard direction finding (D/F) equipment,[150] and strategic signals intelligence made available from sources under the control of the Admiralty and the Government Code and Cypher School (GCCS).[151]

The accuracy of the information received was critical. If a ship, submarine, or aircraft made a report that was of dubious reliability, then the information was not immediately plotted and subsequent reports by that unit had to be treated with caution. If incorrect information was plotted, then the Fleet Commander's understanding of the situation would be faulty and contact with the opposing force might be missed or a deployment carried out that was

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[149]Russell Grenfell, 'Training in Tactics,' Naval Review, Volume XI, 1923, p. 684.

[150]Tactical direction finding equipment was installed in capital ships after Jutland and the concept was first tested during fleet exercises conducted during the latter part of the war; see Brister Papers, IWM/MISC/1010/65/1. Barham shadowed Queen Elizabeth during a nighttime encounter exercise by fixing her position from wireless signal transmissions. Barham subsequently engaged her. See King Journal entry 26 January 1922, King Papers, IWM/90/23/1.

[151]At the time of the Spanish Civil War, the Royal Navy benefited from the ability of GCCS to intercept and decode Italian naval wireless traffic. See Wesley K. Wark, 'British Intelligence and Small Wars in the 1930s,' Intelligence and National Security, Vol. 2, No. 4, 1987, p. 73. In the Far East, the Navy enjoyed success against Japanese naval traffic and by 1938 were decrypting the operational codes used by the Imperial Japanese Navy. See Antony Best, 'Constructing an Image: British Intelligence and Whitehall's Perceptions of Japan, 1931-1939,' Intelligence and National Security, Vol. 11, No. 3, July 1996, p. 408.

detrimental to the tactical requirements at hand. A discussion regarding the two types of plotting is now in order.

Strategical Plot. The Strategical Plot was maintained on a squared board, typically to the scale of five miles to the inch, and tracked the presumed movements of the enemy fleet from first report to the conclusion of the action.[152] In addition, the Strategical Plot depicted:

> the position of the Fleet Flagship at 5 or 10 minute intervals, the positions of outlying units of the Fleet, minor actions, points of land or enemy bases, and the position of the enemy as deduced from all available intelligence.
>
> On the situation as revealed by the "Strategical plot" depend the movements of the Fleet until visual contact is made with the enemy.[153]

A benefit of maintaining the Strategical Plot was that an understanding of the general situation could be garnered during the approach phase and allow subordinate commanders to 'appreciate the Commander-in-Chief's intentions and act according to his requirements.'[154] By collating, assessing, and plotting all information received, a picture could be developed of the probable disposition of the enemy battlefleet,[155] even in the absence of sighting reports of heavy ships, by tracking the lines of direction and advance of the enemy's screening forces.[156]

Tactical Plot. The Tactical Plot correlated the

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[152]ADM 116/2090, Commander-in-Chief, Atlantic Fleet letter No. 709/A.H. 710 dated 21 May 1920.

[153]Ibid.

[154]ADM 116/2090, Precis of 14 August 1919 lecture delivered by Lieutenant Commander W. S. Chalmers, 'Tactical Plotting,' Royal Naval Staff College.

[155]C. A. G. Hutchinson, 'Battle by Night, Naval Review, Volume X, 1922, p. 12.

[156]ADM 116/2090, Precis of 14 August 1919 lecture delivered by Lieutenant Commander W. S. Chalmers, 'Tactical Plotting,' Royal Naval Staff College.

information required once contact had been established and was kept on a gridded board to the scale of one or two miles to the inch.[157] Whilst the primary purpose of the Tactical Plot was to arrive at the correct firing solution for the ship's (or ships') guns, it also supported the requirements for torpedo fire control.[158] The plot was initiated just prior to contact of the opposing forces based on the information passed from the Strategical Plot, and tracked the speed and course of the firing ship and the presumed track of the ship likely to be engaged.[159] The estimated distance to the opposing target was determined by rangefinders, whilst the True bearing of the targeted ship was forwarded to the Tactical Plot from the Torpedo Control Position and from the Gunnery Transmitting Station.[160] The Tactical Plot was amended to reflect the location of any minefields, the presence of any coast lines, and the likely arcs of enemy torpedo fire.[161]

If a key strand of the earlier 'dreadnought revolution' was the shift from local control, where each turret ranged and fired independently, to director control where all the ship's main guns came under central control, the culmination was the coordination of an entire battle squadron's fire through a process labelled master ship control.[162] Initially, the information necessary to coordinate such a fire plan was passed visually through range clocks mounted on the control top and deflection

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[157]ADM 116/2090, Commander-in-Chief, Atlantic Fleet letter No.709/A.H.710 dated 21 May 1920.

[158]Ibid.

[159]Ibid.

[160]Ibid.

[161]Ibid.

[162]The best study of the dreadnought revolution is Jon Tetsuro Sumida, In Defence of Naval Supremacy: Finance, Technology, and British Naval Policy, 1889-1914 (Boston: Unwin Hyman, 1989).

scales applied to the main turrets. In time, the range clocks and deflection scales were removed. Instead, the information required to coordinate the fires of multiple ships was passed electronically via a wireless communications link established between the transmitting stations of the several ships where it was plotted,[163] and, in a somewhat similar fashion, the concentrated torpedo fire of a squadron's ships could be coordinated.

Whether the information received was destined for the Strategical Plot or for the Tactical Plot, a degree of error was inherent in the information. A common problem was that for units making a sighting report, the time and positional information contained in the report was difficult to correlate to that of the receiving ship, while the accuracy of rangefinding suffered due to engine vibration when ships travelled at speed.[164] Similarly, direction finding information, whether received from a shore station or a fleet unit, could not pinpoint the exact location of the transmitting source but only an approximation. In an attempt to reduce the positional and time errors associated with the sighting reports of screening forces, an approach using the benefits of echo sounding and direction finding termed Radio/Acoustic reporting was developed. When sending a sighting report, the reporting ship concurrently dropped a depth charge. D/F bearings based on the sending ship's wireless signal were plotted, whilst echo sounding equipment identified the position of the ship based on the time it took for the explosion to travel through water from the source to the receiver.[165]

Finally, one last source of information available for

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[163]See Journal entry dated 26 July 1923, Madden Papers, NMM/MDN/1.

[164]Journal entry 3 April 1929, Beaufoy-Brown Papers, LHCMA.

[165]Ibid., entry dated 24 January 1929 and Journal entry dated 10 June 1937, Milford Haven Papers, IWM/DS/MISC/9.

plotting must be mentioned: radar. The Royal Navy was at the fore in its development, and the Type 79X, operating on a wavelength of 4 metres, was fitted in Rodney and the cruiser HMS Sheffield prior to the outbreak of war in 1939.[166] Yet, its promise was not without risk, and in a Service versed in exploiting the intentions of an adversary through signals intelligence, the danger that radar emanations by the fleet could prove of more use to an enemy was a concern. Indeed, Rodney had been able to detect Sheffield at a distance of 100 miles by tracking her radar emissions during a late pre-war exercise.[167]

The Use of Aircraft on British Capital Ships. By the end of the 1914-1918 war, aircraft routinely operated from flying-off platforms fitted to Royal Navy capital ships and acted as an advance scouting element for the fleet. During the war, all post-dreadnought ships had been earmarked for modification to operate aircraft, though, in the event, only 26 capital ships actually embarked aeroplanes by conflict's end.[168] By 1 December 1918 the Grand Fleet was operating 99 aircraft, whilst another 77 planes of mixed type were operating from shore stations in direct support of its operations.[169] In addition, by the time of the Armistice over one hundred airships were employed in support of naval operations.[170]

As the aircraft carrier became a regular unit in fleet operations the continuing need or wisdom for aircraft to

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[166]Derek Howse, Radar at Sea: The Royal Navy in World War 2 (Basingstoke: Macmillan Press, Ltd., 1993), p. 26.

[167]Ibid.

[168]R. C. Cronin, Royal Navy Shipboard Aircraft Developments 1912-1931 (Tonbridge: Air-Britain, Ltd., 1990), p. 61.

[169]'Royal Air Force State of Personnel and Materiel Readiness' dated 1 December 1918, Phillimore Papers, IWM 66/9/1.

[170]Arthur Hezlet, Aircraft and Seapower (London: Cox and Wyman, Ltd., 1970), p. 104.

operate from battleships and battle cruisers was debated. Against their usefulness in acting as a scouting force and spotting for gunnery and torpedo fire, was the liability that they brought to a ship through the storage of aviation spirit, the compromises that they forced in fleet evolutions when launching or recovering aircraft, and the concern that locating catapults or flying off platforms atop the turrets of the main armament weakened the fighting efficiency of the capital ship's main weapon. Moreover, the float planes which operated from capital ships were, in the main, less capable than their counterparts operating from aircraft carriers.[171] A further argument against the retention of aircraft on capital ships was that with limited financial resources, on the one hand, and limited deck space on the other, the retention of catapults meant that fewer anti-aircraft guns could be mounted and less money was available to build carriers.[172] Yet, initially, there was a strong case to be made in retaining an organic aircraft capability for capital ships. Admiral Madden while serving as the Commander-in-Chief, Atlantic Fleet argued that:

> It is desirable that capital ships and light cruisers should again carry fighting planes; the threat from torpedo planes can only be adequately met by attack from the air. Squadrons of vessels detached from the fleet are unlikely to be accompanied by a carrier, and many other occasions must occur in war when ships or squadrons will have to depend on themselves for protection...[173]

Madden's plea was made as the period of his command of the Atlantic Fleet approached its end, and he reflected upon

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[171]Chatfield letter to Vice Admiral Sir Hugh J. Tweedie, Commander-in-Chief, The Nore dated 4 March 1935, Chatfield Papers, NMM/CHT/3/6.

[172]Roskill, Naval Policy, Volume II, pp. 397-398.

[173]ADM 1/8628/130, Commander-in-Chief, Atlantic Fleet letter No. 1119/A.H. 1220 dated 14 August 1922 to Admiralty.

the experience gained from commanding what was the premier naval force in existence. His advocacy of embarking aeroplanes aboard capital ships had been consistent, yet he was primarily a champion of the carrier and sought its integration as a tactical unit in the fleet.[174]

However, the argument that capital ships should retain an organic air capability went beyond simply the need to safeguard the defensive requirements of that vessel. The argument was also advanced that the provision of aircraft, particularly reconnaissance and fighter types, on surface ships would allow the true offensive potential of the carrier to be realised as it would be possible then to embark more torpedo and bomber aircraft.[175] As these grew heavier in weight, it became necessary to adopt the catapult, employing a cordite or compressed air charge,[176] to launch an aircraft and to dispense with the practice of simply using a flying off platform mounted above the turret.[177] In 1926, the Admiralty decided to provide catapults for its heavy ships and cruisers, but deferred procuring the necessary aircraft to operate from them until after 1935.[178] Thus, in 1932 and 1933 none of the Mediterranean Fleet's heavy ships and only Valiant and, for a brief time, Hood in the Atlantic/Home Fleet operated

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[174]See ADM 1/8576/341, Commander-in-Chief, Atlantic Fleet letter No. 1293/A.H.0036 of 2 December 1919.

[175]ADM 1/8733/38, 'Provision of Catapults for Battleships, Battlecruisers, and Cruisers, and the Development of the Fleet Air Arm,' un-dated and un-numbered Admiralty minute.

[176]ADM 186/560, 'C.B. 3003(26), Progress of the Fleet Air Arm Up To 30th September, 1926,' Admiralty, Naval Staff, Naval Air Section dated March 1927, p. 12.

[177]ADM 1/9007/79, Director Naval Air Division minute M.003500/33 dated 16 December 1933.

[178]ADM 1/8733/38, Assistant Chief of Naval Staff un-numbered minute dated 29 September 1928. The decision was made for reasons of economy. A similar decision resulted in carriers operating less than their full complement of aircraft.

aircraft.[179]

Although, the first tentative steps in the Navy's use of aircraft certainly predated the 1914-1918 war the onset of conflict saw an expansion in means and ability on the part of the Royal Navy that brought upon it at one point the role of air defence of Great Britain.[180] Peacetime had brought retrenchment, but the vital role of aircraft in support of fleet operations was recognised and the requirement that all capital ships should operate aircraft was approved by the Admiralty.[181] Still, if aircraft were retained during the period, the function that they fulfilled had altered. Where once they were carried to maximise the effectiveness of naval gunfire, their use evolved over time to one of supporting fleet air defence, and, finally, by the end of the period, to assisting in the scouting and reconnaissance requirements of the fleet and in conducting limited strikes. This evolving role was the result of the limitations in carrier tonnage permitted by naval treaty, the desired range to be aimed at in an action between battlefleets, and the performance characteristics of the aeroplanes themselves. Their use aboard surface ships, rather than in aircraft carriers, was a compromise and clearly recognised as such, and caused Admiral Sir Roger Backhouse[182] to comment that:

> I wish to say, too, in my opinion, it is fallacious to suppose that we can create

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[179]Navy List, January 1932, pp. 201-210 and Navy List, January 1933, pp. 200-209.

[180]Till, 'Impact of Airpower on the Royal Navy in the 1920's', p. 178.

[181]Roskill, Naval Policy, Volume I, p. 244

[182]Later Admiral of the Fleet Sir Roger Roland Charles Backhouse (1878-1939). Flag Captain, Battle Cruiser Force (1916); Director of Naval Ordnance (1920-1922); Commanding Officer, Malaya (1923-1925); Rear Admiral. Third Battle Squadron (1926-1927); Vice Admiral, First Battle Squadron (1932-1934); Commander-in-Chief, Home Fleet (1935-1938); First Sea Lord (1938-1939); retired and promoted Admiral of the Fleet (1939).

> a large and efficient Fleet Air Arm by the policy of crowding aircraft into all our ships. If we want a large Fleet Air Arm we must have carriers from which to operate the aircraft.[183]

Much had changed during the period that would alter the assessment on the need to carry aircraft in surface ships. For one, catapult-launched aircraft were being outstripped in performance by land-based aircraft. It was in recognition of this trend that Naval Staff in 1936 concluded:

> The Staff agree that the general increase in air efficiency to be gained by carrying aircraft in carriers and the gain in A.A. armament in battleships by the omission of the catapult are such as to warrant very serious consideration being given to omission of catapults and the building of extra carriers....The above conclusions have been arrived at from full consideration of the great increase in efficiency inherent in carrier-borne when compared with catapult-borne aircraft and the impairment of the A.A. efficiency of the ship resulting from the fitting of catapults....The A.A. armament of the ships will almost certainly be engaged on numerous occasions before the main armament and it is upon this armament that the security of the vessels against air attack for their final offensive must rest. The catapult aircraft can contribute little or nothing to security against air attack. Furthermore it is improbable that the aircraft will survive the blast of the A.A. armament.[184]

For ships operating Torpedo-Spotter-Reconnaissance (TSR) aeroplanes rather than Spotter-Reconnaissance (SR) aircraft, the allowance of ordnance was increased with the provision of three 500 lb. and two extra 250 lb. bombs for

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[183]ADM 1/9088/63, Backhouse letter to Cunningham dated 31 December 1936.

[184]ADM 1/9088/63, Director of Tactical Division minute 94/36 dated 10 June 1936.

each unit embarked.[185] By September 1939, the Fairey Swordfish was the most prevalent aircraft operating from capital ships,[186] though the Fairey IIIF had been the aircraft which had seen the widest service with the Fleet Air Arm during the 1919-1939 period.[187] Whilst the air component of its carriers was obsolescent towards the end of the period, for their limited duties the aircraft embarked on capital ships were adequate to the task. The limited strikes that they were expected to launch were against naval targets and not military targets ashore. Indeed, the Service was loath to contemplate using even its carrier air wings with their limited numbers in such a manner.[188]

The Threat and the Means of Protection Employed in British Capital Ships. Protective measures of both a passive and active nature can be employed to minimise the risk of damage to both crew and ship and to alleviate damage once sustained. For example, as a result of its experience during the late war, the Service introduced a flame retardant balaclava to protect crew members from the intense heat associated with cordite burns, whilst respirators were introduced to provide protection from asphyxiation.[189] Additionally, measures can be adopted in a ship's design to maximise its survivability when the object of direct attack, and the 'tactical requirement of

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[185]ADM 186/104, 'C.B. 01777(37), Naval Ordnance, Basis of Reserves,' Admiralty, Gunnery Branch dated 1937, pp. 40-41.

[186]Malaya, Warspite, and Repulse operated two each whilst Barham and Rodney were equipped with a single Swordfish. See Admiralty 'Pink List' as of 3 September 1939, Peachey Papers, NMM/PCY/11.

[187]Chaz Bowyer, The Encyclopedia of British Military Aircraft (London: Bison Books, 1982), p. 69.

[188]See particularly ADM 1/9088/63, Backhouse letter to Cunningham dated 31 December 1936.

[189]ADM 1/8628/122, Commander-in-Chief, Grand Fleet letter No. 1742/h.f. 1187 dated 2 August 1916.

a battleship was that it should be sufficiently well balanced as regards gun power and protection that it could not be destroyed by chance.'[190]

The Threat from Naval Gunnery. The question of how much was enough in capital ship protection revolved around considerations of the threat and the range at which an engagement between battlefleets was desired. A presumed advantage of the Five Power Treaty was that it defined the maximum surface threat to be faced. The Naval Staff came to the view that fleet action at ranges of 12,000 to 16,000 yards provided the optimum advantage to the Royal Navy. This advantage was based on the extra armour protection that the Service's heavy ships possessed vis-à-vis her rivals and a belief in the superior gunnery of British capital ships.[191] In short, the need was to provide sufficient horizontal armour protection to withstand 16-inch shellfire at the furthest range at which an enemy was likely to begin registering hits whilst affording adequate vertical protection to withstand the enemy's fire at the range when the fleet's offensive fire would prove decisive. Thus, the:

> staff requirement is that magazine shall be safe from a 16" shell at ranges of 30,000 yds. As the shell will not commence to dive inside ranges of 20,000 yds., these two ranges represent the extremes over which diving shell need to be considered.[192]

As the magazine represented the one place on which a chance hit could prove lethal, this eventuality had to be

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[190]Chatfield speech to the Institution of Naval Architects, May 1933, Chatfield Papers, NMM/CHT/3/6.

[191]ADM 1/9387 contains extracts from 'C.B. 01847, Tactical Notes, Volume II,' that provide estimates on the zones of immunity enjoyed by British, American, and Japanese capital ships. C.B. 01847 is not on file at the Public Record Office.

[192]ADM 1/9284, Director of Naval Construction minute G.02613/1928 dated 8 December 1928.

minimised through armour protection to deck and turret areas. Still, adequate side armour was essential to allow the fleet's heavy ships to prevail at the presumed decisive ranges as specified in the Battle Instructions. Accordingly, the Director of Training and Staff Duties observed that:

> Records show that our rate of hitting the enemy in ship v. ship actions rises rapidly inside of 16,000 yards and it is, therefore, our plan to get to this range and ships must be protected to enable them to do so....Thick side armour is therefore essential to protect our ships for sufficient time to enable them to achieve decisive results on getting to a range in which a high rate of hitting is possible in ship v. ship action, i.e., between 12,000 and 16,000 yards.[193]

Thus, the Service believed that the capital ship was relatively immune to destruction from long range gunnery and held that:

> neither war experience nor analysis of peace practices support the contention that concentration fire at long ranges will achieve destruction with the ammunition available.[194]

Moreover, a benefit of building a ship to withstand the risk of long range plunging shell fire was that it also afforded a degree of immunity from a direct hit delivered by high level bombing. As the maximum velocity a free falling bomb could reach was about 800 feet per second and did not approach the maximum velocity of a shell fired by a heavy gun,[195] a ship designed to withstand a direct hit

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[193]ADM 1/9284, Director of Training and Staff Duties un-numbered minute dated 8 February 1929.

[194]ADM 1/8658/69, un-titled and un-dated Royal Naval College lecture delivered during the 1922-1923 session.

[195]In comparison, the 16-inch guns of Nelson and Rodney had a muzzle velocity of 2,525 feet per second when firing a full charge. See ADM 186/291, 'C.B. 1837, Director Firing Gear for "Nelson" Class, "Kent" and Later Class

from surface gunfire was in a strong position to withstand the direct effects of high level bombing.[196]

However, while the Service's own assessment may have stressed the desirability of seeking a gun action at the 12,000-16,000 yards' range, this was not necessarily the intention of other naval powers. The Naval Staff received reports in 1922 that the recently commissioned battleship HIJMS Mutsu[197] was conducting successful gunnery practices at ranges in excess of 30,000 yards,[198] whilst the battleship USS Tennessee[199] was engaging at 35,000 yards and straddling at 32,000 yards.[200] And, incredibly, the German armoured ships Deutschland[201] and Admiral Scheer[202] were reported to be firing successfully at distances up to 48,000 metres.[203] Such ranges exceeded the maximum range of four-fifths of British heavy ships,[204] and the Service had little choice but to press forward with its reconstruction programme and

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Cruisers, and for Vessels Fitted with "Adventure" Type Director Gear, 1929,' Admiralty, Gunnery Branch, Plate 64.

[196]John H. Narbeth and Reginald Bacon, 'Battleship Construction,' Bacon, ed., Glorious Navy, p. 96.

[197]Commissioned 1920, armed with eight 16-inch guns of 34,000 tons displacement.

[198]ADM 186/258, 'C.B. 962,' p. 33.

[199]Commissioned 1920, armed with twelve 14-inch guns, and of 32,000 tons displacement.

[200]ADM 186/261, 'C.B. 971, Progress in Naval Gunnery, 1923,' Admiralty, Naval Staff, Gunnery Division dated April 1924, p. 56.

[201]Commissioned 1933, armed with six 11-inch guns, and of 16,000 tons displacement.

[202]Commissioned 1934; details as per Deutschland.

[203]ADM 186/328, 'C.B. 3001/35,' p. 110.

[204]Jon Tetsuro Sumida, "'The Best Laid Plans': The Development of British Battle-Fleet Tactics, 1919-1942," The International History Review, Volume XIV, Number 4, November 1992, pp. 687-688.

develop shells such as the 6-crh[205] that facilitated longer range fire.[206]

The Underwater Threat. The danger of mines was countered by the streaming of paravanes, basically a submerged kite, which had first been fitted to Royal Navy ships during the war as an anti-submarine measure.[207] Deployed from the forecastle or stem of a ship by derricks or from a turret mount, two paravanes, complete with serrated cutting heads, were trailed at a variable depth by towed wires.[208] With a heavy ship steaming at 15-16 knots, the paravanes were set to run at a depth five feet greater than the ship's draught and extended out to about 100 feet from the beam.[209] When contact was made with a moored mine the paravane first guided the mine down and away from the ship and then cut the cable, releasing the mine to the surface. Still, their use by a capital ship was not without risk as the mine, once released, was liable to strike the streaming ship.[210] Moreover, the paravane could not deal with a mine located directly in front of a ship's bow, was of limited use in handling magnetic or acoustic

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[205]Calibre radius head defined the shape of the shell head. The greater the crh value, the sharper the shell head and, thus, the less air resistance acting against the shell.

[206]The range of the 15-inch Mk I mount of the Queen Elizabeth and Royal Sovereign-classes firing a 4-crh shell was 23,734; when firing a 6-crh shell the range became 32,200 yards. See Raven and Roberts, British Battleships, p. 423.

[207]Robert F. McKay, 'The Paravane,' dated 15 September 1919, ADM 1/8556/101.

[208]Capital ships carried four paravanes with two serving as spares. See entry for 17 May 1926, Midshipman Journal of H. A. V. Haggard in Admiral Sir Vernon Haggard Papers, Imperial War Museum, London, IWM/85/21/3.

[209]ADM 116/2306, 'Notes on Technical Subjects.'

[210]See Beaufoy-Brown Journal, entries 17 and 18 July 1928, for Rodney's exercises with variable depth paravanes, Beaufoy-Brown Papers, LHCMA.

mines,[211] and could not alleviate the threat posed by a floating mine.[212] Battleships with their slower speed were fitted with a heavier type of paravane than battle cruisers.[213] Although the different types operated in a similar manner, the heavier model placed more strain on the towing wires and caused fraying. As such, the cable supporting the tow could be expected to last about six days, if in continuous use.[214] Alternatively, the Two Speed Destroyer Sweep was employed as means of defeating the mine.[215] An outgrowth of the High Speed Mine Sweep, the Two Speed Destroyer Sweep, first practiced in 1926, had the capital ship follow in the wake of an escort vessel employed to clear a path for the heavier vessel.[216] This method, too, had its risks as the following warship had to maintain close station on the sweeping destroyer. When Rodney formed on HMS Tara during one such evolution off Weymouth, she collided with the stern of the destroyer.[217] Moreover, the Two Speed Destroyer Sweep, with its requirement to operate at moderate speed, hindered

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[211]'Narrative of the Service of Captain V. H. Haggard,' p. 72, Haggard Papers, IWM/85/21/2.

[212]ADM 186/451, 'C.B. 1758, Handbook of Protector Paravanes, 1926,' Admiralty, Torpedo and Mining Department, dated December 1926, p. 11.

[213]'Narrative of Service,' Haggard Papers, IWM/85/21/2, p. 76.

[214]ADM 116/2306, 'Notes on Technical Subjects.'

[215]ADM 186/501, 'B.R. 622, Pamphlet on Paravanes, Types S Mark I and S Mark I* and the Two Speed Destroyer Sweep (T.S.D.S), 1933.'

[216]ADM 189/46, 'C.B. 1770,' Annual Report of the Torpedo School, 1926,' p. 68 and facing page.

[217]Journal entry dated 17 July 1928, Beaufoy-Brown Papers, LHCMA.

destroyer Asdic operations.[218]

The High Speed Mine Sweep referred to previously had been the prescribed method for mine clearance during the 1914-1918 war and in its immediate aftermath. As a means of protecting a heavy ship, it suffered when operated in shallow waters such as those found in the Baltic Sea. During the visit of Hood and Tiger to Scandinavian ports in June 1920, the destroyers HMS Vega and HMS Vectis lost their sweeps whilst practising the manoeuvre.[219] The failure of the High Speed Mine Sweep, in this case, was viewed with dismay by the Director of Operations as the Admiralty was actively contemplating the use of heavy ships in Baltic waters against the Soviet Union.[220] The use of the paravane often entailed a slight reduction in the ship's speed as drag was increased,[221] but capital ships of the period routinely practiced their streaming and tested their efficacy against inert mines filled with sand.[222]

By the end of the 1914-1918 war the non-contact mine, sensitive either to acoustic or magnetic influence, had

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[218]ADM 1/8735/71, Admiralty letter No. M02505/28 to Commanders-in-Chief, Mediterranean and Atlantic Fleets dated 23 August 1928.

[219]ADM 116/1881, Rear Admiral, Battle Cruiser Squadron, Atlantic Fleet letter No. 377 dated 5 June 1920. During the same evolution, Hood severely damaged a paravane when it struck a submerged wreck.

[220]ADM 116/1881, Director of Operations Division un-numbered minute dated 22 June 1920.

[221]Journal entry dated 11 June 1921, King Papers, IWM/90/23/1.

[222]ADM 116/2217, Reserve Fleet Orders dated 19 July 1924. Marder implies that the Royal Navy forgot the value of paravanes by World War Two. Based on an extensive review of tactical exercises, nothing could be further from the truth. See Marder, From the Dardanelles to Oran, p. 50.

been developed.[223] As these mines rested on the bottom of the sea and were not moored by cable, the paravane proved of little value.[224] Instead, special sweeping tactics were developed using trawlers to deal with bottom-laid mines,[225] and the method was tested several times in the waters approaching Alexandria, Egypt during the Abyssinian Crisis.[226] Still, whilst the Service understood the risks of the magnetic mine, it took no practical steps until the outbreak of the war to alleviate through the process of degaussing the charged field introduced to a ship's hull during construction by riveting.[227]

Capital ship paravanes and the High Speed Mine and Two Speed Destroyer Sweeps were complementary to each other, and their combined effectiveness was thought to be great,[228] yet such sweeps required precise station-keeping and the application of little or no helm in the trailing heavy ships. A worry therefore for the Navy was that a fleet was acutely at risk when steaming through confined waters thought to be mined, if a gun action ensued and deployment

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[223]Lewis Ritchie, 'Mines and Minesweeping, Bacon, ed., Glorious Navy, p. 227. British magnetic mines had been laid off Zeebrugge and the Schelde in 1918. See Eric Grove, ed., The Defeat of the Enemy Attack on Shipping, 1939-1945 (Aldershot: Ashgate, 1997), p. 237.

[224]At times, the noise from streaming a paravane caused influence mines to self-detonate.

[225]ADM 186/466, 'C.B. 1842, Manual of Minesweeping, 1929,' Admiralty, T. M. Department, dated October 1929, pp. 5-52.

[226]ADM 1/9085/57, Senior Officer, First Minesweeping Flotilla letter No. M.S.0001 to Commander-in-Chief, Mediterranean dated 18 March 1936. The risk that a capital ship might be mined at Alexandria and block the fleet from deploying to its alternate port, the Bay of Navarin, was particularly acute.

[227]ADM 189/59, 'C.B. 1770(39), Annual Report of Torpedo School, 1939' dated April 1940, p. 83.

[228]ADM 186/78, 'C.B. 3011, War Game Rules, 1929,' Admiralty, Naval Staff, Tactical Division dated April 1929, p. 84.

was required. Such a risk was inherent in any passage of the fleet to Singapore which, perforce, had to negotiate either the Sunda or Malacca Straits, and the seriousness of the threat accounts, in large measure, for the frequency with which anti-mining procedures were practiced.

In order to reduce the risk of mine and torpedo damage, bulges, double bottoms, and a water jacket were fitted to absorb the shock of underwater explosive detonation. The bulge increased the beam of the ship from approximately six to fifteen feet and thereby protected the hull proper from a direct underwater detonation.[229] The exact risk that the torpedo posed to heavy ships was difficult to gauge, and revolved around estimates regarding the size of the warhead, the actual type of weapon (contact or non-contact; ship launched or aerial), the range at which the attack was initiated, the scale of attack, and the point of detonation. The issue was further complicated by whether it was assumed the number of torpedoes hitting a heavy ship were in the same vicinity, on the same beam, or evenly dispersed. Thus, Captain Cecil Usborne[230] estimated that existing capital ships could possibly withstand up to five hits and still remain effective fighting units.[231] During fleet exercises, the rule of thumb established by 'C.B. 3011,' the manual covering war game rules, was that six torpedo hits were required to totally disable or sink a battleship.[232] Nevertheless, one Director of Naval Construction offered the sober assessment for a

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[229]Bacon, ed., Glorious Navy, p. 95.

[230]Later Vice Admiral Cecil Vivian Usborne (1880-1951). President, Naval Anti-Aircraft Gunnery Committee (1919-1921); Commanding Officer, Malaya (1927) and HMS Resolution (1928).

[231]ADM 1/8658/69, lecture titled 'Naval Tactics, 1924' by Captain C. V. Usborne to Royal Naval College, Greenwich dated 27 June 1923.

[232]ADM 1/9007/79, Director of Tactical School letter No. 862/25 dated 8 May 1934.

Nelson-class vessel that 'if a torpedo succeeded in striking at the same place as one preceding it, the ship would probably be rendered helpless at once.'[233]

Static tests to measure the presumed lethality of the Service's torpedoes, as well as to determine the requisite defensive protection for the Royal Navy's heavy ships, were conducted on a model labelled the 'Chatham Float'.[234] Tests were conducted to measure the effectiveness of torpedoes armed with both 500 and 750 lbs. warheads,[235] whilst additional tests to determine the expected damage resulting from a 1000 lbs. armed torpedo were used to calculate the side protection required for the second King George V-class.[236] It was felt that the survivability of the capital ship, at least from submarine launched torpedoes, was likely to be enhanced as a result of the development of Asdic. If both an inner and outer screen of escorts, so equipped, were operating with the battlefleet, the submarine would have to make an attack from long range to avoid detection and the chance of achieving a hit would be less.[237]

Fleet exercises, such as 'E.A.' conducted in January 1922, highlighted the fact that while a heavy ship when screened by destroyers might expect to avoid a single submarine-fired torpedo, the likelihood of evading a salvo

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[233]ADM 1/9270, Director of Naval Construction minute M.03012/26 dated 22 December 1926.

[234]The Chatham Float was also used to test the damage an underwater mine could be expected to inflict on the magazines of capital ships. See Tennyson-D'Eyncourt un-numbered minute to First Sea Lord dated 10 January 1921, Beatty Papers, NMM/BTY/8/2/24.

[235]ADM 1/9270, Director of Naval Construction minute M.03012/26 dated 22 December 1926.

[236]Second Bucknill Committee Report dated 25 April 1942, Binney Papers, IWM/PP/MCR/95.

[237]ADM 1/8658/69, Royal Naval College, Greenwich lecture delivered by Captain J. A. G. Troup on 30 and 31 January 1924.

of several torpedoes was another matter.[238] Furthermore, in a surface action, a British battlefleet might face upwards of 400 torpedoes launched in a mass attack by destroyers, cruisers, and the opposing battlefleet. Such an assault, it was felt, would result in upwards of 40 hits being registered against ten capital ships.[239] To be sure, the Atlantic Fleet assessment was pessimistic in the extreme as the difficulty of coordinating such a combined attack with surface vessels that, of necessity, would have to launch their attacks at different ranges were not addressed. Moreover, by 1924 an experienced submariner, Captain Max Horton[240] believed that the ability of a submarine to deal a mortal blow to modern capital ships through a torpedo attack was much diminished.[241] The fact, however remains that the threat from the torpedo, whether launched from a submarine, a surface warship, or an aeroplane was viewed with great concern throughout the period, and the risk was most acute in restricted waters, such as the Johore Straits or Scapa Flow, where the room for a heavy ship to manoeuvre was limited.[242]

The Air Threat. Still, of all the threats facing the capital ship, the danger from the air was always the most contentious. Much of this was tied to the promise of

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[238]ADM 1/8628/130, Commander-in-Chief, Atlantic Fleet to Admiralty letter No. 1119/A.H.1120 Admiralty dated 14 August 1922.

[239]Ibid.

[240]Later Admiral Sir Max Kennedy Horton (1883-1951). Commanding Officer, Resolution (1930); Commander, First Cruiser Squadron (1935); Commander, Reserve Fleet (1937); Commander-in-Chief, Western Approaches (1942).

[241]ADM 1/8658/61, Commanding Officer, Conquest letter No.028/147 to Commander-in-Chief, Atlantic Fleet dated 2 April 1924. Horton proposed the development of midget submarines to attack a fleet in harbour or at sea as a remedy.

[242]ADM 1/9649, Naval Intelligence Directorate minute 0520/38 to Assistant Chief of Naval Staff et al. dated 14 May 1938.

airpower made by advocates[243] of the air and the attention the issue received in the popular press.[244] In this regard, demonstrations such as Brigadier General William Mitchell's against the former German battleship Ostfriesland[245] in 1921, and the Royal Air Force test against HMS Superb[246] in 1922 generated more heat than light in the debate over the vulnerability of the capital ship, and a contemporary witness could write:

> In the forenoon all captains & Flag Officers came aboard to witness a film of the sinking of various ex-German ships by American bombing aeroplanes, which we had seen the previous evening. Considering the height at which the machines apparently flew, & the fact that their targets were at anchor it struck one that air bombs are not so alarming and dangerous for a ship as the Press so frequently points out, as it took a considerable time (1) for any hits to be secured & (2) for the ship to sink after several hits had been obtained.[247]

Confusing such assessments was that any calculation on the air threat facing heavy ships was subject to continuous alteration, as the technology of both aircraft and their

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[243]Amongst the advocates were William Mitchell, Winged Defense: The Development and Possibilities of Modern Air Power, Economic and Military (New York: Dover Publications, 1988) and Giulio Douhet, The Command of the Air (Washington: Office of Air Force History, 1983).

[244]Though he witnessed the experiment that the U. S. Navy carried out in October 1920, it was not until a London newspaper published a photograph of the USS Indiana as a twisted wreck and the story caused a sensation in America did Mitchell press for having the Army Air Service conduct a test with live ordnance. See Maurer Maurer, Aviation in the U. S. Army, 1919-1939 (Washington: Officer of Air Force History, 1987), p. 115.

[245]Commissioned 1911, armed with twelve 12-inch guns, and of 22,400 tons displacement.

[246]Commissioned 1909, armed with ten 12-inch guns, and of 22,000 tons displacement.

[247]Journal entry dated 8 July 1922, King Papers, IWM/90/23/1.

weapons evolved. Further, the argument was conducted in the abstract without references to a specific enemy threat or the presumed theatre of action. For its part, the Royal Air Force in 1923 believed that:

> (a) An attack on a fleet at sea by fleet aircraft at night is not at present a practicable proposition.
> (b) An attack on a fleet at sea by aircraft based on shore is a feasible proposition under certain conditions, but the opportunity is not likely to occur frequently, and will probably be of a fleeting nature.
> (c) An attack on a fleet in harbour by fleet aircraft is a practicable proposition provided the attack is arranged so that aircraft can either return to carrier in daylight or fly back to their own base.
> (d) An attack on a fleet in a harbour by an aircraft based on shore represents an ideal form of attack, and, if carried out by aircraft based at a distance from their objective and utilising an advanced refuelling base, would be an impossible type of attack to counter.[248]

Moreover, in kind, an attack from land-based aircraft was viewed as a more distinct threat than an attack from an opposing fleet air arm. In the case of the former, airfields were likely to be more numerous than carriers and it would be extremely difficult for the Navy's own limited air arm to strike at such fields.[249]

The Royal Navy and Royal Air Force conducted tests to estimate the threat from the air. Those tests, in addition to the Superb test mentioned previously, included low, medium, and high altitude bombing, and the risk of fighter sweeps against the lightly-protected bridge areas of capital ships. Tests were conducted against ships operated under wireless remote control, such as the pre-dreadnought

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[248]ADM 1/8726/132, Air Staff memorandum No. 7 of May 1923.

[249]ADM 1/9007/79, Rear Admiral, Aircraft Carriers letter No. A.C843/2 to Commander-in-Chief, Home Fleet dated 2 March 1934.

HMS Agamemnon and the destroyer HMS Opportune. In addition, a full scale replica of Hood operated by Excellent, the gunnery training establishment, was employed in the bombing experiments conducted from late 1921 through August 1922.[250] Controversy surrounded the results as, of necessity, the attacks could not be actively countered, and the aircraft violated the rules governing the test programme.[251] It was generally accepted, however, that improved armour protection must be provided to bridge personnel to reduce the risks from aircraft strafing attacks and that the best defence was an aggressive offence to forestall such strikes in the first instance.[252] The Admiralty's Gunnery Division concluded that a reasonable assessment must be that the accuracy of high altitude bombing was at least as accurate as long-range naval gunnery.[253] A concession of sorts, perhaps, but the Chief of the Air Staff stressed that the effectiveness of bombing did not depend entirely upon achieving direct hits.

> "It is true," said Trenchard, "that the percentage of direct hits in high bombing at the last Agamemnon trials was five per cent, but if close misses are counted the percentage was eighteen. It is on close misses we depend to sink ships (for) it is against the unprotected bottom that the force of the delayed action bomb develops.[254]

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[250]ADM 1/8613/177, Commander-in-Chief, Portsmouth minute 2541/017 dated 21 September 1921 and Commanding Officer, Excellent letter No. S.26 to Commander-in-Chief, Portsmouth dated 24 August 1922.

[251]ADM 1/8613/177, Commanding Officer, Excellent letter No. S.26 to Commander-in-Chief, Portsmouth dated 24 August 1922.

[252]ADM 1/8613/177, Director of Gunnery Division unnumbered minute dated 11 September 1922. During the tests, mannequins had been placed in selected exposed positions and suffered casualties of 20%.

[253]ADM 1/8624/79, Director of Gunnery Division unnumbered minute dated 5 September 1922.

[254]Hugh Trenchard, cited in Andrew Boyle, Trenchard (London: Collins, 1962), p. 473.

Agamemnon was bombed again in 1923 and, in 1924, by three flights of three aircraft each having flown 150 miles to reach their objective.[255] As the bombing results against Agamemnon were significantly poorer in 1924 than in 1923, the Gunnery Division assessment cited the greater distance travelled by the attacking aeroplanes as a contributing factor.[256] Further tests were carried out in 1924 with Monarch, from 1929 with Centurion,[257] and in 1932 with Marlborough acting as the target ships.[258] The results of the last named demonstration, at least to one naval air officer serving in Courageous, showed that surface forces were not yet at serious risk when he wrote:

> With regard to all this talk about the fleet being destroyed by bombs, I think the trials on the Marlborough proved it all to be sheer nonsense. They of course are absolutely secret.[259]

The threat from the air became more than just an abstract issue during the Abyssinian Crisis, and the deficiency in the fleet's air defences led directly to the development of the anti-aircraft cruiser. Yet the risk and palliative had long been recognised within the fleet. Following exercises conducted in June 1924 that saw torpedo aircraft launch a series of successful attacks against the battleships Resolution[260] and Royal Oak, Rear Admiral W. H.

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[255]ADM 186/263, 'C.B. 977, Progress in Naval Gunnery, 1924,' Admiralty, Naval Staff, Gunnery Division dated April 1925.

[256]Ibid., p. 52.

[257]Till, 'Impact of Airpower on the Royal Navy in the 1920s,' p. 70.

[258]Burt, British Battleships of World War One, p. 206.

[259]Lieutenant Crichton letter to Roger Keyes, MP dated 25 February 1936, Halpern, ed., Keyes Papers, Vol. II, pp. 349-350.

[260]Commissioned 1916; details as per Royal Sovereign.

D. Boyle[261] had recommended that a special screening cruiser be developed for fleet use to deal with the air threat.[262] Boyle's recommendation was not seconded by Admiral Oliver, the Atlantic Fleet commander who wrote to the Admiralty that:

> While I concur that this type of craft would be most useful in war time, I do not consider that the cost involved in laying them down in peace would be justified, and I think it probable that the majority of Flag officers would prefer to have a corresponding value in cruisers, destroyers and aircraft.[263]

In addition to the practical demonstrations previously discussed, the Service twice chartered a Naval Anti-Aircraft Gunnery Committee to analyze the nature and extent of the air threat and the equipage necessary to counter the projected level of attack. The first committee, under Usborne, met from 1919-1921 with the broad remit to determine:

> (1) What forms of aerial attack may be expected by ships generally, and which of these need to be specifically countered by the gun from the ship.
>
> (2) What are the most suitable weapons for adoption in the navy for operations against hostile aircraft.
>
> (3) In what numbers should anti-aircraft weapons be allocated to H.M. ships of various classes, and what should be the calibre in each class.
>
> (4) What systems or methods of control must be adopted to enable these weapons to

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[261]Sir William Henry Dudley Boyle, later Admiral of the Fleet the Earl of Cork and Orrey (1873-1967). Commanding Officer, Repulse (1917-1918) and Tiger (1919-1921); Rear Admiral, First Battle Squadron (1924-1925); Rear Admiral, Second Battle Squadron (1925); Vice Admiral Commanding, Reserve Fleet (1928); Commander-in-Chief, Home Fleet (1933-1935); Commander-in-Chief, Portsmouth (1937-1939).

[262]ADM 1/8685/151, Rear Admiral, Second Battle Squadron letter No. 533/1. to Commander-in-Chief, Atlantic Fleet dated 3 February 1925.

[263]ADM 1/8685/151, Commander-in-Chief, Atlantic Fleet letter No. 682/A.F.1. to Admiralty dated 15 April 1925.

be used to the greatest advantage.

(5) What apparatus, and what grouping of weapons are recommended to carry out the recommendations made in reply to (4), observing that every endeavour is to be made to use existing apparatus.

(6) In brief, what systems and what apparatus other than those recommended for adoption under (3) and (4) have been considered by the committee, and why rejected.

(7) What future developments of aerial attack are foreseen, and what recommendations are made with a view to the navy keeping abreast of, and combating them.

(8) What systems of training in shooting and control should be given to officers and men, and what targets are most suitable for carrying out this training.[264]

Having reviewed the various threats in extant, the committee concluded that the torpedo-carrying aeroplane was the greatest threat to the battlefleet,[265] and that an interim response was the immediate development of a temporary system for the control of anti-aircraft fire in capital ships.[266] This measure was largely completed by 1928 when the Standard Temporary System (STS) was fitted in all capital ships save the Iron Duke-class.[267] STS was viewed as only a stopgap fire control measure, and the High Angle Control System (HACS) was the promised solution to developing effective anti-aircraft fire. In 1929, Rodney, Revenge, and Malaya became the first heavy ships to be fitted with HACS.[268]

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[264]ADM 186/244, 'C.B. 1561,' p. 77.

[265]ADM 186/245, 'C.B. 1577, Final report Naval Anti-Aircraft Gunnery Committee,' dated 18 June 1921, p. 13.

[266]Ibid., p. 25.

[267]ADM 186/289, 'C.B. 3001/27, Progress in Naval Gunnery, 1927,' Admiralty, Naval Staff, Gunnery Division dated March 1928, p. 54.

[268]ADM 186/298, 'C.B. 3001/29, Progress in Naval Gunnery, 1929,' Admiralty, Naval Staff, Training and Staff Duties Division dated March 1930.

A second sitting of the Naval Anti-Aircraft Gunnery Committee began in October 1931.[269] It reviewed at length the possible forms of attack (i.e., precision bombing, dive bombing, torpedo, gas, and 'B' bombing[270]), the performance of existing aircraft, calculated the time available for a ship to defeat such attacks, and weighed the benefits of defensive manoeuvring.[271] In reaching its conclusions, the committee drew upon the record of recent fleet exercises, and if a criticism can be levelled against its proceedings, it is that it sought to define the measures to defeat such attacks. outright rather than ensuring the survivability of the surface warship. By 1933 the dive bomber was viewed with increasing concern, and the Service's steps to counter such an attack were hampered by the lack of a suitable target to replicate such a threat.[272]

Damage Control. As it is easier to provide greater reserve buoyancy in a larger vessel, the survivability of capital ships was not helped by the artificial tonnage limitations imposed by the Washington Naval Treaty. The defensive measures of watertight sub-division, anti-torpedo bulges, double bottoms, horizontal armour, and redundant machinery all made demands on ship size as measured in displacement, and one writer of the period could claim that:

> From a purely naval standpoint we should do better with no artificial limit, that is, with freedom to build to absolute standards. Nevertheless, a 35,000 ton ship is far from

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[269]ADM 186/317, 'C.B. 1915.'

[270]Buoyant bomb. An attack where the diving aircraft bombed short of the target with the detonation occurring beneath the vessel's bottom. See ADM 186/560, 'C.B. 3003(26),' p. 31.

[271]ADM 186/317, 'C.B. 1915.'

[272]ADM 186/323, 'C.B. 3001/34, Progress In Naval Gunnery, 1934 Edition,' Admiralty, Naval Staff, Training and Staff Duties Division dated April 1934, pp. 6 and 63.

> negligible...[273]

In the event that damage was sustained below the waterline, the question arose whether it was advisable to perform counter-flooding to reduce the degree of list present as a part of a ship's damage control actions. In 1937, an understanding of the trade-off between reserve buoyancy and the amount of list acceptable in a ship was inexact, at best, but a lesson drawn from the loss of Audacious during the 1914-1918 war was that counter-flooding was not desired. The body established to investigate and recommend changes in the Service's damage control procedures noted that Audacious:

> sank owing to damage from a mine which flooded her port engine room and other compartments. After the explosion she assumed a list which was partially corrected by the immediate counter-flooding of a few compartments. The amount of water admitted was comparatively small, but it was unnecessary and added nothing to her safety. Finally, when she had lost her freeboard aft, the sea broke over the quarter-deck, and forced its way below through hatches and ventilators, a condition which was undoubtedly aggravated by the loss of buoyancy and freeboard caused by voluntary flooding.[274]

Thus, during the interwar period it was the case that a larger ship was a more survivable ship.

The Threat Evaluated. There was a point beyond which the capital ship could not be expected to meet all forms of

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[273]'Major,' 'Size of Capital Ships,' Naval Review, p. 256.

[274]ADM 1/9188, 'Report of the Committee on Damage Control,' dated October 1937. Of the reasons cited for the loss of HMS Prince of Wales in December 1941, it was noted that the failure to counter-flood resulted in many of the secondary guns not being able to train; see Second Bucknill Committee Report dated 25 April 1942, Binney Papers, IWM/PP/MCR/95. This conclusion is disputed in 'B.R. 1736(8)(48), Battle Summary No. 14, Loss of H.M. Ships Prince of Wales and Repulse 10th December 1941,' Admiralty, Naval Staff, Training and Staff Duties Division, p. 14.

attack successfully by itself. In this, there was nothing that was new. Jellicoe during the late war had fought to retain his significant destroyer forces in the face of the growing submarine threat to merchant shipping. What was new was the proliferation of such threats. Indicative of this trend, the Commander-in-Chief, Mediterranean warned that:

> The most serious form of attack on the British main fleet are considered to be those from the air, and from the submarine by day, and in a lesser degree from destroyers by night. Against submarines the A/S destroyer is the only antidote; against the other forms of attack it is believed that a light fleet cruiser can be constructed that will be effective....It is considered imperative to strengthen the A/A defence of the battlefleet - the core of strength. This is being done as far as possible in the battleships themselves, but it is not considered that this will be enough, and reinforcement from ancillary vessels is required...'[275]

Even the most conservative of naval officers recognised that the capital ship was vulnerable to the myriad threats facing the surface fleet, and, indeed, the Royal Navy lost no fewer than eleven battleships and three battle cruisers in the period up to October 1918.[276] When the old battleship HMS Britannia was sunk by submarine UB-50 just two days before the Armistice, no fewer than twelve capital ships had been lost during the war to various causes.[277] With the rise of submarines and aircraft, naval

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[275]ADM 1/8828/123/35, Commander-in-Chief, Mediterranean to Admiralty letter No. 05/429 dated 3 January 1935. A/S refers to anti-submarine while A/A refers to anti-aircraft.

[276]From an official summary of Allied losses through October 1918, Admiral Sir Walter Henry Cowan Papers, National Maritime Museum, Greenwich, NMM/COW/6.

[277]Halpern, Naval History of World War I, p. 401. The ships lost and their causes were, by submarine: Britannia, HMS Formidable, Triumph, Majestic, and HMS Cornwallis; by surface naval gunfire: Queen Mary, Invincible, and

warfare had moved into the realm of the three dimensional; a fact that was appreciated in 1914, even if the exact risk was unknown. Following the war, the chief threats facing capital ships were mines, torpedoes, shell fire, bombs, and, theoretically, ramming.[278]

Mines and torpedoes could be delivered by air, surface, or subsurface means whilst shell fire could come from other warships or from coastal artillery batteries. Armour-piercing shells were the greatest danger to the ship itself in gun actions, though the risk of chemical attack was viewed with increasing alarm. While Royal Navy ships had not experienced chemical attack during the war the risk was viewed seriously enough that training in defensive measures was adopted by the early 1920's.[279] Battle drill with gas masks was a regular feature in shipboard evolutions,[280] and boards, coated with a special paint to

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Indefatigable; by mine: Audacious, HMS Russell and HMS King Edward VII; by the combined effects of mine and shore gunfire: Irrestible and Ocean; by surface torpedo attack: Goliath; and by internal explosion: HMS Bulwark and HMS Vanguard.

[278]The ram, for a time, had been seen as a primary weapon in naval warfare. Its demise was due to the growing lethality of the gun, the mine, and the torpedo. Hood was the first British dreadnought type ship to be built with a raked bow; see James Dolby, The Steel Navy: A History in Silhouette 1860-1963 (London: MacDonald, 1962), p. 19. See Hughes, Fleet Tactics for a modern assessment of the ram.

[279]While no direct evidence has been found that the Royal Navy experienced a chemical attack at sea attack during the late war, ADM 1/8693/269 contains extracts of a 1923 article published in Proceedings describing a German chemical attack against the flotilla leader HMS Botha off the Belgian coast in 1917. The accompanying minutes do not confirm the event.

[280]See Lambert Journal, entry dated 11 October 1922, Lambert Papers, IWM/90/19/1 and Journal entry dated 27 May 1927, Drage Papers, IWM/2/3/82. As Lambert makes clear,

detect the presence of persistent agents, were affixed to key locations when attack was thought probable.[281] The Service expected that the next naval war would be fought in a chemical environment, and that individual protective measures would not be sufficient. Indeed, the hindrance that fire control personnel faced in attempting their duties whilst encumbered with respirators resulted in the adoption of collective measures. The Greenwich Air Purifier System, fitted in all heavy ships, allowed Transmitting Station personnel in battle cruisers and Torpedo and High Angle control personnel in battleships to work free of respirators.[282] The expectation that naval warfare would be fought in a chemical environment has received too little attention by postwar historians. This expectation helps explain the Royal Navy's view that the battlefleet was still central to naval power and that the carrier was a supporting arm. Heavy ships, not faced with the problem of moving their main weapon from a protected magazine to an exposed deck, were more easily defended and fought in the presence of chemical weapons than an aircraft carrier.

The vulnerability of the capital ship to the torpedo, whether delivered by air, submarine, or another warship was amply demonstrated on a regular basis in fleet exercises. If anything, though, these evolutions tended to minimise the actual damage that would be inflicted in war as Beaufoy-Brown noted in an exercise during the spring of 1928:

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the masks used by the Royal Navy afforded no protection against carbon monoxide poisoning. Thus, a reasonable assumption is that when worn they were primarily meant as a defensive measure to counter the potential effects of mustard and phosgene gases and not for fire suppression.

[281]See HMS Eagle War Order dated 1 May 1937, Oliver-Bellasis Papers, NMM/BEL/152.

[282]ADM 186/82, 'C.B. 3021,' p. 9 and ADM 186/270, 'C.B. 981, Progress in Naval Gunnery, 1925,' Admiralty, Naval Staff, Gunnery Division dated April 1926, p. 15.

> Red Fleet was attacked by a flight of torpedo planes from Furious. These planes delivered their attack from behind a smoke screen which had been laid by other aeroplanes. "Nelson" was hit by several torpedoes and was therefore compelled to reduce speed from 15 knots to 11½ knots.[283]

As the Royal Navy had ample opportunity to observe the lethality of the torpedo against its capital ships during the late war, the mere loss of 3½ knots assessed to Nelson raises questions about the scripting of fleet exercises that will be addressed in due course. Invariably, the Royal Navy could not escape a degree of mirror imaging in assessing any threat against the capital ship based on its own improving offensive capabilities. This was especially true of the underwater threat. While it believed itself to be ahead of its rivals in developing innovation in underwater warfare, it was not complacent enough to assume that the other naval powers were idle in their endeavours. During the period the Royal Navy developed a gyroscopically controllable torpedo dubbed the 'W' torpedo from the zig-zag pattern that it ran after running a predetermined straight course,[284] and the magnetic firing pistol.[285] The latter device sought to maximise the effectiveness of an underwater detonation by taking advantage of the 'water-hammer effect' caused when an explosion occurred removed from the hull proper--particularly if detonation were achieved directly beneath the unprotected area of the ship's bottom.[286] These developments and a Naval

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[283]Journal entry dated 24 May 1928, Beaufoy-Brown Papers, LHCMA.

[284]ADM 186/444, 'C.B. 0975, Progress in Torpedo, Mining, Anti-Submarine, and in Allied Subjects, 1924,' Admiralty, Naval Staff, Torpedo Division dated April 1925, p. 6.

[285]ADM 1/9354, Director of Tactical Division un-numbered minute dated 4 April 1933.

[286]Ibid. Till records that the 'water-hammer effect' was an issue of the greatest contention between the Air and Naval Staffs in assessing the effectiveness of high level

Intelligence assessment that the Japanese were probably developing wireless-controlled and gliding torpedoes highlight the fact that the underwater threat was viewed as the greatest of risks.[287]

During the middle of the 1930's, the Service continued to view the capital ship as its primary offensive weapon. The ability of heavy ships to deal effectively with the various threats posed to them therefore was vital not only in itself, but for the perceived continuing viability of seapower. Accordingly, it is worth quoting at length an Admiralty assessment:

> 6. While all weapons will bear their part in the defeat of the enemy, British tactics aim primarily at so placing the battlefleet in action that Gunnery superiority is assured and the destruction of the enemy thereby achieved.
>
> To obtain this result it is imperative that adequate provision be made to give the battlefleet security from those weapons which can prevent it from reaching and retaining the desired position. These weapons are principally, the submarine, the destroyer and aircraft.
>
> 7. It is Their Lordships' opinion that modern developments in detection devices and the tactics of anti-submarine screens can provide reasonable security from the submarine. The efficiency of the secondary armaments of the capital ships and the power of our own flotillas in counter-attack give reasonable security from destroyer attacks by day, and the experience that has been gained in night screening and the method of counter-attack now developed go far to limit this threat by night.
>
> 8. Defence against air attack, however, is not yet assured, and our

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bombing. As the same effect was central to the effectiveness of magnetic torpedoes and influence mines, a generous interpretation is that the Service entertained mixed views on the lethality of the effect. See Till, 'The Impact of Airpower on the Royal Navy in the 1920s,' p. 92.

[287]ADM 1/9649, Naval Intelligence Directorate minute 0520/38 to Assistant Chief of Naval Staff et al. dated 14 May 1938.

> measures to counteract it are incomplete. It is as least possible that by use of his forces an enemy might prevent or delay attainment of our tactical object. Unless we have not only reliable A.A. defence and the means of counter-attacking in the air our ships run the risk of continual bombing attack.[288]

In establishing the Naval Anti-Aircraft Gunnery Committee in 1919, the Service recognised at an early date the potential risk. This should not come as a surprise; the Royal Navy had been at the forefront in the development of naval aviation. Its response on the surface may appear superficial and inadequate. Though it took immediate steps to implement STS and sought a more permanent solution with HACS, it thought initially in terms of countering an attack by a single aircraft.[289] Certainly, during live fire anti-aircraft practices it was the case that it frequently dealt with attacks by only a single target. Yet, in its defence, it must be admitted that before a large-scale air raid could be mastered, it had to perfect the means of dealing with the most basic of attacks. Moreover, just as the Air Ministry was taxed with providing sufficient targets, the Admiralty was constrained in its funding for more than a single HACS per ship. The first requirement was to field a system and gain experience on the widest possible basis. By 1931, the Service felt confident enough and financially able to provide a second HACS for its capital ships.[290] Still, defeating an air attack required more than just material means. By 1935, it was concluded that a dedicated Air Defence Officer responsible for directing a ship's anti-aircraft fire was a requirement in all capital ships,

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[288]ADM 1/9007/79, Admiralty letter No. M.03500/33 to Commanders-in Chief, Mediterranean and Home Fleets dated 20 February 1934.

[289]ADM 186/309, 'C.B. 3001/31,' p. 63.

[290]Ibid.

aircraft carriers, and cruisers,[291] and, in 1936 this tentative organisation was increased by the addition of an assistant.[292]

The Reconstruction of Capital Ships during the Interwar Era. Forced by treaty and the Naval Estimates to forego much new construction, the Service settled upon a programme of reconstruction to enhance the effectiveness of capital ships. With only twelve of its capital ships modernised, the programme, in the end, was unable to make good the deficiencies in all heavy ships prior to the outbreak of war in 1939, and, even in those ships rebuilt, there were limits to what could be achieved.[293] On this last point, an observation by the Admiralty's Tactical Division was particularly telling when it noted:

> Protection, in particular, is very difficult to add to a ship at a later date; and this is the present situation in regard to the great majority of the capital ships, and all the 8" cruisers of our fleet at the present time; they are inadequately protected and (anyhow in the case of the battleships) we cannot remedy the situation.[294]

The Tactical Division's assessment continued with the observation that the threats facing the heavy ships of the Navy were not so similarly constrained and continued its warning by advising that:

> Considerable progress must be expected in various directions during the above period, e.g., attack from the air will probably develop considerably, in extent and technique. Attack will be made in low visibility and at night; high bombing with 2000 lb. bombs and the development of "B" bombing may be expected. In underwater

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[291]ADM 186/328, 'C.B. 3001/35,' p. 6.

[292]ADM 186/338, 'C.B. 3001/36,' p. 61.

[293]Schofield, British Sea Power, p. 141.

[294]ADM 1/9354, Director of Tactical Division un-numbered minute dated 4 April 1933.

> attack, the magnetic pistol will threaten the (at present) unprotected bottoms of ships, and the effect of near misses by big bombs will have to be considered. Extreme range gunfire has already, with the aid of aircraft spotting, become accepted policy in the American fleet.[295]

The reconstruction programme touched upon almost every facet of a capital ship. The maximum elevation of main turrets was increased to enhance a ship's offensive potential, whilst its defensive attributes were strengthened through the addition of bulges to the hull. The reconstruction of a heavy ship resulted in a host of changes of a more mundane nature that were necessary, if the battleship and battle cruiser were to operate effectively in what was viewed as the likely environment of the next naval war. To this end, the armoured hatches connecting passageways to compartments and decks were enlarged to allow personnel encumbered with gas masks to pass.[296]

Summary. For the Royal Navy, the 1919-1939 period was a time of retrenchment, consolidation, and, finally, growth. This pattern of experience is no more evident than in the changing fortunes of its heavy ships. If the Service experienced, for the most part, a general hiatus in the construction of new capital ships, the Navy still attempted to ensure the offensive effectiveness of the battleship and battle cruiser through a programme of limited reconstruction. It continued to research, test and develop the technology of the capital ship's primary weapon system--the large calibre naval rifle. Moreover, it sought to augment the ability of heavy ships to handle aircraft even if the aircraft themselves were not always embarked due to financial constraints. There were differences of opinion within the Service on the need and wisdom to embark

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[295]Ibid.

[296]Journal entry 5 December 1927, Haggard Papers, IWM/85/21/3.

aircraft, maintaining a torpedo armament, the desired range at which a fleet engagement should take place, and on the number of personnel required to man the ships. These arguments were never resolved during the period. The Service's approach, then, was to opt for a middle course and take no decision that was irrevocable. Guns and shells were therefore modified to allow for fire at longer ranges, though the Service thought increasingly in terms of a fleet engagement that differed little in distance than that experienced at Jutland. Torpedoes were not fitted to the latter King George V-class battleships, yet they were retained in her predecessors.

In the end, due to the strictures of the several naval treaties, financial constraint, and its requirement to operate on a global basis, there were limits in the material advances that the Service could pursue in capital ship technology. Any improvements in the effectiveness of the capital ship in the face of such limits had perforce to come from within. Thus, the balance of this study will examine British naval strategy, operations, the tactical doctrine of the Royal Navy during the 1919-1939 era and the place of the capital ship.

PART III

CHAPTER IV

BRITISH NAVAL STRATEGY OF THE INTERWAR PERIOD

...if we wait till Japan shows a warlike tendency before making our essential preparations she will never allow us to complete them.[1]

Commander Bertram Watson[2]

If there is a naval war between Great Britain and Germany during the next ten years, we shall control German overseas communications by exactly the same means as we did in the last war.[3]

A. C. Bell

A strategical plan which fails to provide means for tactical success is foredoomed to failure...[4]

'Naval War Manual, 1925'

...we should have lost the battle of Trafalgar on a Staff Appreciation...[5]

Chatfield

Viscount Jellicoe's survey of individual Dominion and

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[1]Plans Division minute dated 23 May 1925, Richmond Papers, NMM/RIC/7/3a.

[2]Later Vice Admiral Bertram Chalmers Watson (1887-1976); Commanding Officer, Valiant (1933-1934); Chairman, Damage Control Committee (1937).

[3]A. C. Bell, Sea Power and the Next War (London: Longmans Green and Co., 1938), p. 133.

[4]ADM 186/66, 'C.B. 973, Naval War Manual, 1925,' Admiralty, Naval Staff, Training and Staff Duties Division dated October 1925, p. 5.

[5]Chatfield cited in Arthur Marder, Old Friends, New Enemies: The Royal Navy and the Imperial Japanese Navy Strategic Illusions, 1936-1941 (Oxford: Clarendon Press, 1981), p. 51.

Commonwealth naval requirements commented upon in the Introduction was handicapped by the fact that the strategy that his review was to support was not defined beforehand. Writing to the First Lord, Jellicoe observed:

> it is very difficult to formulate proposals of naval defence without basing them on the existence of a potential enemy, and with the present state of the world it is a delicate matter to select such a potential enemy, but the safety of our sea communications is vital to the very existence of the Empire, and it is undoubtedly essential that we should run no risks in this respect.[6]

Thus, in a sense, Jellicoe's survey was putting the requirements' cart before the policy horse. His answer to this dilemma was to define the naval strategy to be pursued based on his own assessment of the threat facing the British Empire and to assume that any changes of policy his proposals might require would be forthcoming. Ultimately, the failure of the Admiralty to define the strategic parameters guiding the Jellicoe mission detracted from an otherwise excellent survey and doomed its findings when reported.[7] It is, therefore, appropriate to examine British naval strategy of the 1919-1939 period and the maritime threat that it sought to counter. First, a summary of the strategic, operational, and tactical levels of warfare is necessary.

A Hierarchical Structure of Warfare. Military activity is complex, heterogeneous, and has both vertical

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[6]Jellicoe to First Lord letter dated 3 March 1919 cited in A. Temple Patterson, ed., The Jellicoe Papers: Selections from the private and personal correspondence of Admiral of the Fleet Earl Jellicoe, Volume II, 1916-1935 (London: Spottiswoode, Ballantyne and Co., 1968), pp. 290-291.

[7]Based on the instructions provided by the Admiralty, which tasked Jellicoe to evaluate the administrative and organisational structure of the several Dominion navies, it can be argued that the Admiral exceeded his brief. See Admiralty letter M.026163 dated 23 December 1918, Captain Stephen W. Roskill Papers, Churchill Archives Centre, ROSK/7/41.

and horizontal dimensions.[8] At the highest level, strategy is concerned withthe employment of the military forces of a nation or coalition to achieve objectives of policy.[9] It defines goals, assigns forces to a given theatre of operations, and establishes the limits of their use.[10] By its nature, strategy is concerned with the broadest of issues and must weigh the competing demands for military forces from separate theatres of operations. At a step removed, the operational level is concerned with the planning and conduct of a campaign in a defined geographic theatre in furtherance of the overall strategic objective. Finally, the tactical level is concerned with the actual engagement of military forces in battle.[11] It must be noted that such an ordering of warfare owes much to military thinking and the expansion of the battlefield.[12] This is particularly the case in arguing for an operational level in naval warfare.[13] During the period in question, the Admiralty, unlike the Air Ministry and War Office, was both an administrative and operational headquarters.[14] As such, it was organised along staff lines that reflected this hierarchy of warfare. Strategy was the preserve of the Plans Division, the operational tier

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[8]Allan R. Millet, Williamson Murray, and Kenneth H. Watman, 'The Effectiveness of Military Organizations,' Allan R. Millet and Williamson Murray, eds., Military Effectiveness, Volume I: The First World War (Boston: Unwin Hyman, 1988), p. 2.

[9]United States Army, Field Manual 100-5 Operations, 1986, p. 9.

[10]Ibid.

[11]Ibid., p. 10.

[12]Christopher Bellamy, The Evolution of Modern Land Warfare: Theory and Practice (London: Routledge, 1990), pp. 60-65.

[13]Colin S. Gray and Roger W. Barnett, 'Reflections,' Colin S. Gray and Roger W. Barnett, eds., Seapower and Strategy (London: Tri-Service Press, 1989), p. 378.

[14]Hinsley, British Intelligence in the Second World War, Volume I, p. 12.

coincided with the Operations Division, and the lowest rung of the hierarchy corresponded with the Tactical Division. Yet, the fleet was both an operational entity and a tactical formation, and so the Service's organisational structure implied both a confirmation and negation of the hierarchy of warfare. Nevertheless, conceptually, such a structuring offers a useful guide to understanding that the focus of military activity differs based on considerations of scale, duration, threat, and locale.

Naval Strategy. From a historical perspective, a single definition of naval strategy does not exist. Rather, alternative strategies have arisen from time to time. Mahan in his most famous treatise did not state a new concept of naval strategy, but accepted an existing definition where '"Naval strategy has for its end to found, support, and increase, as well in peace as in war, the sea power of a country."'[15] Naval strategy for Mahan was much broader than a military phenomenon but also considered a nation's mercantile affairs as reflected in its seaborne trade and merchant marine. Thus, what he aimed for was a coherent maritime strategy. Corbett noted that the 'object of naval warfare must always be directly or indirectly either to secure the command of the sea or to prevent the enemy from securing it.'[16] He continued by noting that:

> It is this state of dispute with which naval strategy is most nearly concerned, for when the command is lost or won pure naval strategy comes to an end.[17]

Corbett's definition was more circumspect than that of Mahan and a deliberate attempt to expand Clausewitz's

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[15]A. T. Mahan, The Influence of Sea Power upon History 1660-1783 (New York: Dover Publications, 1987), p. 89.

[16]Julian S. Corbett, Some Principles of Maritime Strategy (Annapolis: Naval Institute Press, 1988), p. 91.

[17]Ibid.

general theory of war to a maritime environment.[18] A totally different view of naval strategy is offered by Wegener. He believed that:

> Naval strategy always is geographical [by nature] tied to the geographical-strategic position. What one generally likes to term "strategy" in professional naval literature is simply theatre operations that slide into battle tactics upon contact with the enemy.
>
> Therefore: naval strategy is the science of geographical position, its changes, and its stagnation with regard to trade routes. Offensive strategy is the acquisition of a [superior] geographical position; defensive strategy the stagnation of a geographical position.[19]

Wegener argues, elsewhere, that because the above is the case, a battlefleet stationed in the Caspian Sea would be an absurdity.[20]

A more recent definition of maritime strategy has been provided by Wylie. Accepting that a critical aspect of maritime strategy is securing control of the sea, he states that the ultimate objective is to influence events on land. Maritime strategy therefore ultimately consists of 'the establishment of control of the sea, and the exploitation of the control of the sea toward establishment of control on the land.'[21] Finally, Tirpitz once remarked that 'the selection of a ship design in peace-time is applied naval

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[18]Carl von Clausewitz, On War (Princeton: Princeton University Press, 1976).

[19]Wolfgang Wegener, The Naval Strategy of the World War (Annapolis: Naval Institute Press, 1989), p. 31. Editor's insertion.

[20]Ibid., p. 200.

[21]J. C. Wylie, Military Strategy: A General Theory of Power Control (Sydney: Australian Naval Institute Press, 1967), p. 39.

strategy.'[22] This was more than a platitude, and highlights that a ship is built to a specified design that defines where it can operate, the threat it can expect, and the operational purpose for which it was conceived. However, whether one argues for a maritime or a naval strategy, it is important to distinguish between strategy as an objective and strategy as an approach, and, in its latter manifestation, varying approaches have been adopted. British naval planners of the interwar period pursued alternate naval strategies primarily because the cost of pursuing a single strategy was beyond their means. A review of these strategies and the place of the capital ship in supporting them follows.

Command of the Sea and Sea Control. As the term implies, a naval strategy based on command of the sea seeks to dominate a broad expanse of water to one's own advantage whilst conversely denying such advantage to an enemy maritime power.[23] Sea control implies an advantage that is more restricted in place and duration. Rarely, if ever, though, has a navy that enjoyed command of the sea been able to operate without any regard to threat--the sinking of the pre-dreadnought Britannia in November 1918 and the cruiser USS Indianapolis in July 1945, at times when both the Royal Navy and the United States Navy possessed command of the sea in its purest sense, are evidence of this point. For a navy to aspire to such a strategy many prerequisites are necessary, and some, such as geography, may make it impossible even if others are met. Of the remaining conditions, a strong economy is essential to allow sufficient resources to be applied. Clark notes that a command of the sea strategy implies that a navy can either

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[22]Tirpitz cited in Jonathan Steinberg, Yesterday's Deterrent: Tirpitz and the Birth of the German Battle Fleet (Aldershot: Gregg Revivals, 1992), p. 128.

[23]Brodie, Guide to Naval Strategy, p. 85.

develop or acquire maritime technology equal to the task.[24] This writer accepts the point, but notes also that a navy endowed with numerical superiority may be able to obviate this requirement.

Fleet-in-Being. The fleet-in-being and its corollary, the 'Risk Theory,' are most commonly associated with Grand Admiral Alfred von Tirpitz and German naval strategy prior to the 1914-1918 war. Its purpose is to deny freedom of action to an enemy fleet by holding it hostage to the covering of the weaker fleet.[25] The fleet-in-being is essentially a defensive strategy that fulfills its purpose by eschewing battle and simply maintaining its existence,[26] yet it must present some prospect for battle, lest the stronger power reduce its covering force and operate elsewhere. Thus, its association with the risk theory and the idea that battle may be offered not in the prospect of prevailing, but to weaken an adversary to such a degree that if defeat is suffered, the naval strategy of the stronger power is dangerously compromised.[27] Such a strategy implicitly assumes the presence of a third naval power hostile to the interests of the stronger fleet and a fleet composed of strong surface ships. The inherent flaw of the fleet-in-being strategy is that, if war does transpire, the weaker naval power will be reluctant to put it to the test because the outcome is readily acknowledged. It is with this in mind that Weir notes that as a naval

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[24]Clark G. Reynolds, Command of the Sea: The History and Strategy of Maritime Empires (New York: William Morrow and Company, 1974), p. 7.

[25]Guillermo J. Montenegro, 'Alternative Naval Strategies,' Naval War College Review, Volume XLV, Number 2, Spring 1992, p. 58.

[26]Wegener, Naval Strategy, p. 65.

[27]Holger Herwig, Politics of Frustration: The United States in German Naval Planning, 1889-1941 (Boston: Little, Brown and Company, 1976), p. 41.

strategy it failed utterly for Germany in World War I.[28]

Herwig observes that the Royal Navy's Grand Fleet of the 1914-1918 war was the classic example of the fleet-in-being.[29] Given its reluctance to engage the High Sea Fleet on anything but the most favourable terms (especially after Jutland) Herwig's comment would on the surface appear to challenge the precept that the fleet-in-being is a strategy limited to the weaker naval power. Nevertheless, it is important to remember that Jutland highlighted serious deficiencies of both an operational and material nature in the Grand Fleet. Thus, whilst numerically the stronger naval power, British naval leadership operated the Grand Fleet as though it were the weaker force during 1917.

Guerre de Course and Sea Denial. A guerre de course naval strategy sees the primary attack conducted not against an opposing side's naval forces, but against his unprotected merchant shipping.[30] Such a strategy serves three purposes. First, it causes economic disruption through the direct attack of shipping and the dislocation that follows as the defending side must either disperse or concentrate his merchant marine. Secondly, the defending navy invariably expends more resources in defence than the opposing force does in offence, and, finally, if successfully waged, it denies an adversary use of the sea in a positive form as an adjunct to his military operations. It is this last measure that particularly associates the guerre de course with sea denial. Traditionally, such a strategy called for a force of cruisers operating independently blessed with adequate offensive power, range, and speed. During 1880's France,

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[28]Gary E. Weir, Building the Kaiser's Navy: The Imperial Navy Office and German Industry in the von Tirpitz Era, 1890-1919 (Annapolis: Naval Institute Press, 1992), p. 210.

[29]Holger H. Herwig, 'Luxury' Fleet: The Imperial German Navy 1888-1918 (London: Ashfield Press, 1991), p. 149.

[30]Mahan, Influence of Seapower, p. 31.

a guerre de course naval strategy built around cruisers and torpedo boats was favoured by the Jeune École school at the expense of a strategy built around the battleship.[31] The rise of the submarine and its unrestricted use during the First World War increased the operational effectiveness of this strategy and reduced the prominence of the cruiser as a raider. As such, Germany, while averaging only 28 submarines at sea at any one time forced, the Allies to deploy about 4,000 vessels of various types in anti-submarine warfare operations.[32] A guerre de course strategy is commonly associated as an approach more appropriate to the weaker naval power, as the stronger naval power will deny access to the sea for commerce through its command of the sea.[33] Yet, this association is inexact at best, and the United States Navy's submarine campaign against Japanese shipping during the Second World War is proof enough that the strategy has value for even the strongest of naval powers and can serve as a complement to a command of the sea strategy.

British Interwar Naval Strategy. Given the expanse and the varying degrees of development within the British Empire, its maritime defence was a daunting task for even the strongest of naval powers. Fortunately, if Britain was hard-pressed in the immediate aftermath of the 1914-1918 war, her traditional European rivals, Germany, France, and Russia, were, in many respects, in even more difficult straits. Outside Europe, matters were more troubling for her. Japan and the United States, allies of a kind, had

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[31]Lawrence Sondhaus, 'Strategy, Tactics, and the Politics of Penury: The Austro-Hungarian Navy and the *Jeune Ecole*,' The Journal of Military History, Volume 56, Number, 4, October 1992, p. 587.

[32]ADM 116/2150, 'Submarine Notes,' undated and un-numbered typescript.

[33]Robert W. H. McKillip, 'Undermining Technology by Strategy: Resolving the Trade Protection Dilemma of 1917,' Naval War College Review, Volume XLIV, Number 3, Summer 1991, p. 35.

interests, particularly commercial, that diverged from those of Britain, and, more importantly, were in direct contention with each other. Thus, the initial British strategic dilemma was not so much the prospect of a direct confrontation either with the United States or with Japan, but the possibility that a conflict occurring between the two might unwittingly ensnare the United Kingdom.

Britain's declared naval policy of following a 'One-Power Standard' was sufficient for meeting any single threat; its ability to deal with separate threats in different theatres or a combined threat in a single theatre was more problematic. The naval response to this dilemma was to adopt a strategy of deterrence, and, if deterrence failed, to fight a holding action in the Far East.[34] Thus, by force of circumstances, the Royal Navy followed her traditional strategy of command of the sea in Home waters whilst at the same time adopting the failed approaches previous rivals had employed--the fleet-in-being and guerre de course--for the Far East. The limits of pursuing an effective naval strategy under a 'One Power Standard' with the rise of multiple European threats eventually resulted in the establishment of a 'Two Power Standard' in 1938.[35]

The role of the Royal Navy was to ensure the territorial integrity of the British Empire, maintain her sea lines of communication, and to defeat the naval forces of any enemy. Specifically,

> 17. To the Admiralty has been given by H. M. Government the responsibility for the security of the sea communications of the Empire and for the safety of all British territory against organised invasion from the sea.
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> 18. The function or military aim of the Navy is to destroy or neutralise enemy naval

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[34]ADM 1/9081/53, 'Board Memorandum on a New Standard of Naval Strength,' p. 1.

[35]Cowman, "An Admiralty 'Myth,': The Search for an Advanced Far Eastern Fleet Base before the Second World War," Journal of Strategic Studies, September 1985, pp. 316-326.

forces which threaten that security. This involves battle or the threat of battle.
19. As a contributory or secondary function or military aim, in the interval of time which may necessarily elapse before it is possible to carry out the primary function, the Navy will take all possible measures to weaken the enemy navy and to impair its resources and morale. At the same time naval effort will be directed to strengthen our own Navy, our resources and morale.[36]

Thus, British naval strategy anticipated both offensive and defensive operations by the fleet. Offensively, a fleet action was desired at the earliest favourable date; defensively, the safe passage of British and neutral merchant shipping had to be guaranteed. The means of securing the former was primarily through the battlefleet, though all the forces assigned to the fleet would contribute in this aim, whilst use of convoys would assure the latter.[37] The vital theatre was the North Atlantic irrespective of the nature of the enemy, for if Britain could not secure these waters for her shipping she would be compelled to yield.[38] In the absence of a direct threat in Home waters, the Main Fleet would be held in the Mediterranean due to the amount of trade that passed through these waters and its links to British interests in the Far East.[39]

As an island nation and a maritime empire, Britain was uniquely dependent on her sea communications. This represented both a strength and a weakness. Resources from one theatre could be drawn upon to assist in a conflict in

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[36]ADM 1/8730/190, 'The Function of the Navy.' This citation is also a direct repetition of that found in ADM 186/66, 'C.B. 973,' p. 4.

[37]ADM 1/8802/89/35, 'Naval Staff Appreciation of Requirements for the 1935 Naval Conference, Admiralty Paper No. 1, April 1934. p. 11.

[38]Ibid.

[39]ADM 1/8665/143, Admiralty letter M.1119/24 to Foreign Office dated 9 April 1924.

another theatre, yet those resources could be denied if her sea lines of communications were cut. This dependence on trade was recognised within the Admiralty and documented by the Trade Division.[40] Given her own vulnerabilities, then, a common strand of British naval planning, irrespective of foe, was to maximise enemy economic deprivation by denying maritime trade, and the Admiralty measured the varying degrees that states were dependent on trade, particularly in petroleum.[41] Such an attack, beyond depriving a foe of the material wherewithal to wage war, was likely to result in a fleet action, and a second strand of British naval planning that was commonly held irrespective of enemy was that a decisive fleet action at the earliest date was a desired outcome given her presumed maritime superiority over any single naval power. Finally, the third common strand of naval planning was that with force levels based on a 'One Power Standard,' the fleet could not be divided between European and Far Eastern waters, but must remain concentrated.[42] This last tenet was more honoured in the breach as the chapter on operations discusses. Yet, strictly from a planning standpoint, the Admiralty saw little difference in the availability of its ships operating in Home and Mediterranean waters and their ability to deploy to American or Far Eastern waters.

For deterrence to be effective and to support British diplomatic objectives, the Navy had to be seen as a credible force in peacetime capable of performing its

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[40]'O.U. 6100, Commodity Chart of Great Britain,' and 'C.B. 6100A, Addenda No. 1.' N.B., these documents are not on file at the Public Record Office. Their existence and presumed contents are based on references in several Confidential Admiralty Monthly Intelligence Reports.

[41]'C.B. 1646, Commodity Chart of Japan,' 'C.B. 1646A, Addendum,' and 'C.B. 1684, Commodity Chart of France,' though not held at the Public Record Office, document this vulnerability.

[42]Deputy Chief of the Naval Staff memorandum dated 24 May 1921, Nicholas Tracy, ed., The Collective Naval Defence of Empire, 1900-1940 (Aldershot: Ashgate, 1997), p. 282.

duties in war.[43] Unable to be strong everywhere, the Royal Navy adopted an organisational framework consisting of the Main Fleet, Detached Forces, and Local Defence Forces. This structure allowed it to meet its day-to-day operational tasks yet facilitated a transition to the strategic requirements for war. A summation of this flexible posture was briefed to representatives of the Imperial Conference of 1923 by the Admiralty. It read in part:

> In war the Naval Forces of the Empire must be considered as a single collective Empire Fleet. From the strategical point of view, that Fleet may conveniently be regarded as falling into *three categories*. These three categories are closely interdependent, but they stand in a very definite order of relative importance.
>
> *First and foremost* comes the *Main Fleet*. This must be capable of performing its function of destroying the Main Fleet of the enemy. On it rests the fate of the whole Empire.
>
> *Secondly*, there are the *Detached Forces*, which, backed by the power of the Main Fleet, exercise control of sea communications in areas distant from the main theatre of operations.
>
> *Thirdly*, there are the *Local Defence Forces*, which are necessary in order to free the Main Fleet and the Detached Forces for their proper work on the High Seas.[44]

The above framework was conceptually broad enough to operate on a global basis and was formulated without expressly mentioning a specific theatre or threat. Admiralty war plans were prepared to support operations in two distinct phases. During the first phase of operations, the Main Fleet would pass to its anchorage whilst other

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[43]ADM 223/811, Confidential Admiralty Monthly Intelligence Report, Number 56 dated 15 December 1923, p. 31.

[44]Ibid., pp. 32-33. Original emphasis.

units and squadrons moved to their bases.[45] During the second phase, offensive air, submarine, cruiser, and reconnaissance operations would be initiated, offensive minelaying would be carried out, British and imperial military forces would be transported to the required area, and attacks on enemy shipping would begin.[46]

The Main Fleet, itself, was defined as:

> the principal naval force of the Empire and is composed of various types of ships, battleships, battle cruisers, cruisers, destroyers, aircraft carriers, etc. No type is self-sufficing and all require the co-operation of other types to enable them fully to develop their own special fighting qualities.[47]

Conceptually, then, the Main Fleet of the Royal Navy was a balanced force composed of all serving types of vessels. Yet, there was no mistaking that its primary offensive strength was thought to reside in the battlefleet, and past naval experience had shown that:

> In every maritime war the control of sea communications and tradeways has hitherto been exercised by that Power which, in addition, to possessing sufficient vessels to exercise this control, has been able to concentrate a battlefleet sufficient to destroy or neutralise similar enemy forces.[48]

Thus, the strategic rationale for heavy ships was that they provided the greatest fighting power when formed into a battlefleet, and the battlefleet conformed to the principle of concentration. This is not without irony, as Richmond, recognised perhaps as the severest critic of the capital

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[45]ADM 1/8588/81, Director Plans minute P.D. 1554 dated June 1920.

[46]Ibid.

[47]ADM 186/66, 'C.B. 973,' p. 6.

[48]Ibid.

ship at the strategic level, provided much of the intellectual framework for its existence through his advocacy and teaching of the principles of war.

The Threat and the Naval Response. A single enemy did not present itself to the Service during the 1919-1939 period, but, rather, the Royal Navy assessed its requirements based on a series of presumed threats during the interwar period. The Service tracked both the developments in naval affairs on a global basis, including even the most minor of naval aspirants, and the movement and composition of the world's navies.[49] The evolving threat that the Royal Navy faced can be deduced by reviewing the surviving Admiralty records, examining fleet strategic exercises, observing the changes in curricula at the Royal Naval War and Staff Colleges, and by assessing the resources applied in the gathering of strategic intelligence. In 1923, Dudley Pound, the Director of Plans, recommended that of the joint appreciations for war being prepared those dealing with Japan and France were the more important,[50] whilst plans were also prepared for a possible war with either Russia and Turkey.[51] At the tactical level, the Navy trained, at various times, to fight the navies of the France, Japan, the United States, Germany, and Italy.[52] From a intelligence standpoint, naval

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[49]These developments, along with the general political climate, were summarised and provided to the fleet in Confidential Admiralty Monthly Intelligence Reports beginning in April 1919. Prior to April 1919, information was provided on a twice-weekly basis. See 'Admiralty Intelligence Report,' No. 387 dated 1-3 April 1919, R. A. R. Plunkett-Ernle-Erle-Drax Papers, Churchill Archive Centre, Cambridge, DRAX/5/5.

[50]ADM 1/8646/205, Director Plans minute M.01618/23 dated 8 December 1923.

[51]ADM 1/8672/221, Plans Division minute No. 02061/24 dated August 1924.

[52]ADM 1/8668/177, 'Admiralty Fleet Order 1541.--Models of British and Foreign War Vessels for General Instructional purposes, Small Torpedo Attack Tables, and

resources were directed at intercepting the signal traffic of Germany, Italy, France, Japan, Russia, certain Arabic states, and the United States.[53]

Within the Service, the war game, whether conducted underway at sea with manoeuvre units, or afloat and ashore on a board, was the primary vehicle for assessing British naval performance, training senior officers in making decisions and preparing appreciations, acquainting officers with the capabilities of foreign warships, expounding doctrine as expressed in the Manouevring Orders and Battle Instructions, and validating operational planning for war.[54] The war game was also employed to validate future warship design. Thus, one purpose of exercise 'O.A.' conducted by the combined Mediterranean and Atlantic Fleets in March 1929 was to determine the respective merits of building battle cruisers over fast battleships.[55] The war game rules were written generically to allow for gaming against any potential enemy. Where previously 'Instructions for Tactical and Strategical Exercises' had defined the general characteristics of presumed enemy warships, 'C.B. 3011' merely reflected the offensive potential and defensive attributes of British naval ships, and remained mostly silent on the attributes of enemy naval and air forces, though these were made known to key participants at the start of any war game.[56] An exception to this rule was that

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Gunnery Spotting Tables' dated 8 June 1923, ADM 189/39, 'C.B. 1569, Annual Report of Torpedo School, 1919' dated 24 July 1920, and Journal entry dated 13 July 1937, Milford Haven Papers, IWM/DS/MISC/9.

[53]ADM 223/469, 'Naval Intelligence Division, Volume 10, Special Intelligence.'

[54]ADM 186/78, 'C.B. 3011,' pp. 10-26.

[55]ADM 186/145, 'C.B. 1769/29(1), Exercises & Operations, 1929, Volume I,' Admiralty, Naval Staff, Tactical Division dated December 1929, p. 78.

[56]ADM 186/139, 'O.U. 5243, Instructions for Tactical and Strategical Exercises Carried Out on Tables or Boards,' Admiralty, Naval Staff, Tactical Section dated January

Japanese and American carriers, and heavy ships with embarked aircraft, were credited with performance characteristics not unlike their Royal Navy counterparts.[57]

The war game also featured in joint strategic exercises conducted by the British Army, the Royal Air Force, and the Royal Navy and was used as a basis to assess future force requirements for each of the Services. These exercises were conducted on a periodic basis, usually at the Military Staff College, Camberley, and covered such problems as the forces required to defend Malaya and the doctrine necessary to support amphibious operations.[58] The Services used the results of such exercises to determine their force offerings for various contingencies and to weigh the appropriate type of force to be used. Thus, with respect to Malaya, whether the Navy anticipated having a force of battle cruisers and an aircraft carrier in the theatre of operations influenced, and, in turn, was influenced by the army's provision of air defence and coastal defence batteries, and the number of fighters and bombers retained locally by the air force.[59] If a sizeable naval force were present, then the scale of military and air forces could be reduced as it was believed that any assault could only be attempted once local sea control had been

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1921.

[57]ADM 186/78, 'C.B. 3011,' pp. 10-26.

[58]The 1919 joint exercise examined amphibious warfare; see ADM 116/2086, 'Naval & Military Exercise, 1919' report by Commandant, Staff College, Camberley. A March 1923 exercise examined the reinforcement of Malaya from India and the military, air, and naval forces required to effect relief of the Singapore base; see ADM 116/2394, Air Council letter S.22781 to Admiralty dated 4 September 1923. A December 1924 joint exercise conducted by the Military Staff College, Quetta examined a direct Japanese assault against Singapore; see ADM 203/84, Admiralty letter M.0735/25 to President, Royal Naval College, Greenwich dated August 1925.

[59]ADM 116/2394, Air Ministry to War Office letter S.22781 dated 5 September 1923.

established. Conversely, if a credible naval force could not be provided, then the local military garrison and supporting air forces would have to be strengthened to ensure the safety of the naval base until the arrival of the fleet. Thus, at the strategic level, the role of the capital ship was central not only to naval, but to British and Imperial defence planning overall.

At the Royal Naval War and Staff Colleges, the changes in curricula closely mirrored the Service's estimate of the presumed naval threat during the period and the importance of co-operating with the other Services.[60] The criticism is oft times levelled that the Service was consumed with fighting the Battle of Jutland to the exclusion of more relevant topics of the postwar period.[61] Yet, it must be remembered that Jutland was the only fleet action of the 1914-1918 war, and, it might be added, one that many officers had directly experienced. Of the students attending the 1931 session of the Staff College, no fewer than 16 had been present at the battle, whilst at the 1932 session the number of such students was 14.[62] While an analysis of Jutland and other surface actions of the late war was a prominent feature of interwar staff training, much time was also spent in examining the naval responsibilities of the present and near future. The 1920-1921 curriculum included four sessions on strategy, and, specifically, the issue of war with America directed by

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[60]The Staff College was intended for junior officers and the War College was instituted for the instruction of senior officers. See ADM 203/13, Admiralty letter C.E.2771/19 dated 2 February 1919 to Admiral President, Royal Naval College.

[61]Barry Dennis Hunt, 'Admiral Sir Herbert Richmond: Service Intellectuals and Reform in the Royal Navy, 1912-1931,' Unpublished Ph. D. Dissertation, Queen's University, no date, pp. 221-229 and Marder, From the Dardanelles to Oran, pp. 48-56.

[62]Precis of lecture 'Jutland', Royal Naval Staff College, Greenwich, Session 1932, Tennant Papers, NMM/TEN/41/1.

Richmond, two further general sessions on the United States by Commanders Down and Westacott Abell, and two seminars on Japan led by Commander G. V. Rayment. In 1921-1922, America and British Atlantic strategy were featured in three seminars by Richmond, whilst Japan and the Russo-Japanese War directed by Richmond formed the subject of two seminars. By the 1926-1927 session, the Soviet Union and the Baltic campaign of 1919, Turkey, Japan, and British Far Eastern strategy were featured as the dominant contemporary naval issues. The United States was examined for economic purposes as was France, and a separate lecture was devoted to 'Current Military Problems.' During the 1920's and 1930's, Jutland continued to form a vital part of the Navy's staff and war college training, but the emphasis on co-operating with the army and the air force was no less pronounced. Amongst the senior officers to lecture at Greenwich during the period were Air Commodore Charles Sampson on 'Air Strategy,' during the 1920-1921 session, Air Commodore Clark-Hall during the 1922-1923 term 'On the Tactical Use of Aircraft,' and the future Marshal of the Royal Air Force Lord Tedder on the 'Air Aspect of Combined Operations' in the 1931-1932 sitting.[63]

War with France. In case of war with France, the Admiralty anticipated disrupting French global trade through the regulation of her maritime traffic.[64] Cruisers would visit and inspect vessels for regulated goods, and a blockade would be imposed on the mouth of the River Seine and the port of Marseilles.[65] The Royal Air Force would

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[63]The following review of naval higher education is based on a synthesis of several sources to include the Richmond Papers; Tennant Papers; Thursfield Papers; Chatfield Papers; Oliver-Bellasis Papers; Dickens Papers, IWM; ADM 1/8628/120; and ADM 1/8658/69.

[64]ADM 186/71, 'C.B. 01759A(26), Contraband Control Service Manual, Supplement No. 2,' p. 4.

[65]ADM 1/8739/45, 'France. The Possibilities of the Exercise of Maritime Economic Pressure on France.' Plans Division Study P.D. (T) 015571/30 dated August 1930, p. 11.

strike at communications centres, electrical power stations, and coal and iron mines in northern and northeastern France whilst aircraft carriers operating in the Mediterranean would launch similar strikes on transport and industrial centres in the South.[66] Such a strategy, it was envisioned, would force the French to retain for home defence aircraft otherwise earmarked for offensive operations, and, thus, offer a degree of immunity to British shipping and harbours within close proximity to France.[67] A benefit of the above strategic plan was that France would be isolated from her North African possessions and, thus, her colonial army would be neutralised as a strategic reserve. In March 1935, exercise 'Z.L.' held in the waters adjacent to the Canary Islands presumed an Anglo-French naval war, and tested the defence of British trade plying between South America and the Cape against fast French commerce raiders.[68]

War with Italy. As with its planning for a war with France, the Admiralty Plans Division defined a strategic approach to a possible Anglo-Italian war based on a joint campaign conducted in concert with the Royal Air Force. The aim of such a campaign would be to inflict severe economic dislocation through a combination of naval blockade and a bombing offensive. The naval blockade would seek to sever Italian trade that sustained the industrial centres of the North and limit the importation of foodstuffs; the air offensive would target the electrical power grid supporting the country's industrial production.[69] Again, a benefit of any naval blockade would be the

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[66]Ibid.

[67]Ibid., p. 12.

[68]ADM 186/157, 'C.B. 1769/35(1) and (2), Exercises and Operations, 1935--Vols. I and II,' Admiralty, Naval Staff, Tactical Division dated September 1937, pp. 3-7.

[69]ADM 1/8739/47, 'Italy. The Possibilities of the Exercise of Maritime Economic Pressure Upon Italy,' Plans Division P.D. (T) 015745/30 dated March 1931.

severance of a mother country from her overseas possessions. In this case, Italy would cease to have access to Libya and Italian Somaliland.[70]

From 1935 onwards, the Naval Intelligence Division had been actively engaged in assessing Italian naval and military capabilities with the prospect of war in mind.[71] With the Abyssinian Crisis and the imposition of sanctions, the Service faced war with Italy. The Mediterranean Fleet was reinforced, and the plan that emerged envisioned 'securing and maintaining naval control in the central Mediterranean'.[72] Shore bombardment by Mediterranean Fleet heavy ships was contemplated and included raids at Benghazi and Tobruk in Libya, at Massawah and Hassab in East Africa,[73] and at Augusta Bay, Catania, and the railway hub at Taormina located in Sicily; meanwhile, the Home Fleet would bombard selected points along the west coast of Italy.[74] During 1937 the exercise programme of the Mediterranean Fleet included at least one evolution, 'S.Z.', which tested the general lines of a Anglo-Italian war.[75] Naval planning continued to assume early offensive operations against the Italian fleet during the 1938-1939 period, and a surprise strike by the Fleet Air Arm and heavy ships against Genoa, where three battleships were under construction or repair, was anticipated through the

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[70]Commander-in-Chief, Mediterranean letter 0122/00200 to Admiralty dated 19 March 1936, Roskill Papers, ROSK/7/144.

[71]ADM 223/488, 'Mediterranean,' section staff history by Charles Morgan, p. 94.

[72]Marder, From the Dardanelles to Oran, p. 80.

[73]Present day Mitsiwa and Aseb, respectively.

[74]Draft letter from Drax to Commander-in-Chief, Mediterranean dated 24 January 1939, Drax Papers, DRAX/2/19.

[75]John Winton, Cunningham (London: John Murray, 1998), p. 64.

summer of 1939.[76] By that time, the Navy's planning efforts were assisted by its possession of the Italian Ministry of Marine's 'Conduct of War in the Mediterranean.'[77]

War with Spain. The outbreak of a civil war in Spain, in time, resulted in attacks on British naval and merchant shipping by Nationalist forces and Italian submarines. Following a torpedo attack on the destroyer HMS Havock on 1 September 1937 by an Italian submarine, Eden, the foreign secretary, pushed for a resolute British response.[78] The Admiralty Plans Division proposed four possible ripostes: a blockade of the Nationalist coast; the capture of Majorca whence air attacks had originated; a naval raid on a Nationalist port; and, finally, the prosecution of anti-submarine warfare operations.[79] The last option was adopted, and a key consideration for the Admiralty was to preclude events in Spain escalating into an Anglo-Italian war.[80]

War with Germany. A possible war with Germany receded slowly from British naval planning during the interwar period only to assume renewed prominence at the end of the period. Squadron level tactical exercises involving heavy ships were still being conducted as late as 6 June 1919 with the High Sea Fleet in mind.[81] In time, with the scuttling of her ships at Scapa Flow and its size severely limited by the Versailles Treaty, the German naval threat had for Britain, at last, been contained. Moreover, at

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[76]Paul Stafford, 'Italy in Anglo-French Strategy and Diplomacy October 1938 - September 1939,' Unpublished Ph. D. Dissertation, University of Oxford, 1984, p. 90.

[77]ADM 223/488, p. 94.

[78]Peter Gretton, 'The Nyon Conference--the naval aspect,' The English Historical Review, Vol. XC, No. CCCLIV, January 1975, p. 105.

[79]Ibid.

[80]Ibid.

[81]ADM 189/39, 'C.B. 1569,' pp. 169-170.

least in the initial postwar period, Germany did not maintain its naval forces at even the levels allowed by the Versailles Treaty. This meant initially that it could expect to operate only in the Baltic Sea with any prospect of success. A renewed German naval building programme, which predated the accession to power of Hitler, fundamentally upset the strategic planning of the Admiralty.[82] The result was that the Mediterranean theatre could no longer take precedence over the defence of Home waters. Thus, in 1937, the Board of Admiralty determined that in all cases a naval force had to be retained within British waters sufficient to meet the needs of a German war.[83] The Anglo-German Naval Agreement attempted to limit this liability to no more than 35% of the British surface forces, and the fact that Britain was restricted by naval treaty in her building programme provided impetus to securing such an agreement. The tonnage ratios reached under the Washington Treaty and broadened at the London Naval Conference of 1930 to include cruisers, destroyers, and submarines, had guaranteed the Royal Navy, a theoretical position of parity vis-à-vis the Japanese and German navies. Still, given its geographic proximity, an Anglo-German naval war posed a direct threat to British maritime interests in a manner that a Far Eastern or Mediterranean war never could.[84]

By the time of the Anglo-German Naval Agreement, the Royal Navy was already exercising against a potential naval war with Germany. Exercise 'A', held 14 May 1935, saw the cruisers of the America and West Indies Station defend a New York-bound convoy against attack from ships of the

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[82]ADM 223/819, 'Confidential Admiralty Monthly Intelligence Report,' No. 145, dated 15 June 1931, p. 31.

[83]ADM 1/9081/53, undated and un-numbered 'Board memorandum on a New Standard of Naval Strength.'

[84]Ibid.

Deutschland and Leipzig-classes.[85] During the Spanish Civil War, German naval movements were tracked via interception of ship call signs from wireless signals.[86] The Czechoslovakian crisis of 1938 afforded the Admiralty the chance to follow German naval movements, and her submarines were tracked in Spanish Home waters, the Canary Islands, and Brazil. Yet, no definitive conclusions could be reached about the state of Nazi war planning and the role her capital ships would play in attacking British trade;[87] the primary concern of the armoured ship Deutschland appeared to be self-preservation in the face of Hood.[88] Still, notwithstanding the recent movements of the Deutschland, the Naval Intelligence Division assumed that in a future war, the German Navy would be employed in a more offensive manner than had been the case in the 1914-1918 war. This conclusion was based on its assessment that Hitler would assume supreme command of the navy and that Hitler endorsed Wegener's theory of offensive naval warfare as expounded in The Naval Strategy of the World War.[89]

War with Turkey. The collapse of the Ottoman Empire and its transition into the modern state of Turkey are beyond the scope and purpose of this paper. However, in so far as the Ottoman Empire had been a member of the Central Power coalition of World War I, its demise brought its successor in direct contact, and conflict, with the Allied powers. For the Royal Navy, the Eastern Mediterranean and

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[85]ADM 186/157, 'C.B. 1769/35(1) and (2),' pp. 159-166.

[86]ADM 223/469, Naval Intelligence Division, Volume 10, Special Intelligence.

[87]ADM 223/483, 'C.B. 04019, German Naval Activities During the Czecho-Slovakian Crisis September, 1938,' Admiralty, Naval Staff, Naval Intelligence Division dated 1939, p.17.

[88]Commissioned 1920, armed with eight 15-inch guns, and of 41,200 tons displacement.

[89]ADM 223/827, 'Confidential Admiralty Monthly Intelligence Report,' No. 243 dated 15 August 1939, p. 23.

the Straits were vital arteries to the Black Sea. So long as Britain supported the anti-Bolshevik forces operating in the Crimea, the maintenance of this line of communication was a necessary responsibility of British military and naval forces. Nationalist elements in Turkey rallied following the conclusion of the Treaty of Sèvres in 1920, and engaged in a series of operations with the intent of removing the various foreign forces occupying the country.[90] By August 1922, Turkey had succeeded in this objective as far as her Asian territory was concerned, but a British objective was to forestall the passage of Turkish Nationalist forces in Europe. To this end, the Admiralty directed that British naval forces were to take all measures to prevent this eventuality.[91] During the confrontation, Turkey was receiving naval support from the Soviet Union. The potential, thus, existed that war with Turkey could escalate to a war with Russia in both the Black and Baltic Seas.[92]

By 1926, the Navy again contemplated war with Turkey with the aim of securing passage of the Bosphorous Straits. To this end, plans were prepared for sending a force of battleships through the passage, while air strikes were contemplated from carriers. Of the efficacy of the latter, there remained some doubt, and Keyes advised that:

> What this pressure would amount to on a rural population like that of Asia Minor is another matter. We have been told a great deal about the effect of bombing will have in the next war, but no real data is available. If it cannot be carried out on a much larger scale than in the late war it is not likely to have any more decisive effect than it had at that time. Certainly it does not seem that the few machines which can be operated from Carriers would be

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[90]Nicole and Hugh Pope, Turkey Unveiled: Atatürk and After (London: John Murray, 1997), pp. 55-58.

[91]Admiralty minute M.01279/22, 'Appreciation of the Situation in the Far East, Fisher Papers, NMM/FHR/10.

[92]Ibid.

likely to have any great effect.[93]

Keyes' estimate of the forces required for a possible Turkish war were considerable. In addition to ten battleships, a force of three aircraft carriers, eleven cruisers, six destroyer flotillas, four submarines, and twenty minesweepers.[94] A strong, balanced force, it anticipated a significant naval commitment to secure local command of the sea against a modest naval threat.

War with the Soviet Union. With the fall of the Romanov dynasty and the advent of a radical socialist state, British interests in Eastern Europe, the Near East, the Indian sub-continent, and the Far East appeared threatened to a degree that exceeded even its previous concerns about imperial Russia. In March 1919, the Admiralty anticipated moving units of the Grand Fleet, including the First Battle Squadron, the carrier HMS Argus,[95] and supporting units into the Baltic Sea and the Gulf of Finland to ensure the passage of British mercantile trade.[96] In the event, British heavy ships never deployed, but inshore naval operations against Soviet forces continued until 1920 in the Baltic area.[97] Planning regarding a possible Anglo-Soviet naval war was aided by the Admiralty's possession of the 1930 version of the

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[93]Keyes cited in Halpern, ed., Keyes Papers, Volume II, p. 160.

[94]Ibid., p. 167.

[95]Commissioned 1918, embarking upwards of 15 aircraft, and of 15,200 tons displacement.

[96]Chief of Naval Staff undated letter M.01301 (draft) to Commander-in-Chief, Grand Fleet, Fremantle Papers, NMM/FRE/316b.

[97]The background of this dispute and the actions of the Service are assessed in R. J. Bullen, 'The Royal Navy and the Baltic, 1918-20, unpublished Ph. D. Dissertation, University of London, 1983.

Soviet Navy's Battle Instructions.[98] Ranft and Till argue that for a time during the interwar period, the Soviet Navy was a coastal force that eschewed the doctrine of command of the sea for reasons of ideology and economic constraints.[99] This writer does not dispute their conclusion, but a reading of the 1930 Battle Instructions shows that even in pursuing a coastal defence naval strategy, the Soviet Navy viewed the battleship as the foundation of naval power.[100]

War with the United States. A central tenet of British strategic policy was to avoid a war with the United States. Such a war if fought, might ultimately prove successful, but, in the process, it would be ruinous to Britain's interests. Accordingly, concessions were afforded the United States that were denied to others. The British desire to placate the United States is captured in Baldwin's pronouncement that:

> Never as an individual will I sanction the British Navy being used for an armed blockade of any country in the world until I know what the United States of America is going to do.[101]

Thus, the British refused to let American highhandedness in the enforcement of prohibition escalate unnecessarily, whilst it vigorously challenged the extension of Norwegian and Russian territorial waters over commercial fishing rights traditionally enjoyed by British trawlers. The British abrogation of her treaty with Japan was carried out

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[98]ADM 1/8740/50, 'Russia. The Battle Instructions of the Naval Forces of the R.K.K.A.,' dated 1930.

[99]Bryan Ranft and Geoffrey Till, The Sea in Soviet Strategy (Annapolis: Naval Institute Press, 1989), pp. 94-97.

[100]ADM 1/8740/50, 'Russia. The Battle Instructions of the Naval Forces of the R.K.K.A.,' p. 10.

[101]Baldwin cited in Frank Hardie, The Abyssinian Crisis (London: B. T. Batsford, Ltd., 1974), p. 127.

in the understanding that it was better to antagonise the third naval power than to make an unnecessary enemy of potentially the first naval power. Britain shared gunnery and torpedo information with the United States Navy that was denied to her French and Italian counterparts,[102] and the United States Navy's ability to operate in the Mediterranean theatre was,[103] in large measure, dependent on the access that Britain afforded the Americans at Gibraltar and Malta including assisting in fleet gunnery drills.[104] These concessions were not all one-sided and, the Director of the Gunnery Division noted:

> The use of the U.S.N. of our bases and targets presents good opportunities of obtaining information both as to their methods and efficiency.
>
> Continuation of good relations and intercourse with a go ahead nation such as the U.S.A. is of great value, and we actually do obtain valuable ideas from them, especially as regards high angle shooting.[105]

That said, Britain could not rule out the possibility that such a conflict might be forced upon her. Thus, the Service examined at the Royal Naval War College the general lines of how such a war might be waged, held exercises on war game tables, and conducted at sea exercises in which Red Fleet, the British force, opposed Blue Fleet, the

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[102]ADM 1/8766/43, Extract of Board Minutes dated 30 November 1933.

[103]In 1929, the European Station of the United States Navy was withdrawn. See ADM 223/824, 'Confidential Admiralty Monthly Intelligence Report,' No. 208, 15 September 1936, p. 58.

[104]ADM 186/271, 'C.B. 3001(26), Progress in Naval Gunnery, 1926,' Admiralty, Naval Staff, Gunnery Division dated March 1927, p. 79.

[105]ADM 1/8711/140, Director of Gunnery Division comment dated 26 May 1926 to U.S. Naval Attaché request for visit to Gibraltar by Destroyer Division Twenty-Five.

United States Navy.[106] An example of the last was the exercises conducted by the Atlantic Fleet during its passage from England to Spanish waters during the Spring Cruise of 1921. Hood and Repulse, acting as American battle cruisers, in company with Tiger, representing the American battlefleet, were to intercept the Atlantic Fleet and force an action prior to the latter's arrival at Arosa Bay.[107] As the United States Navy did not possess a single battle cruiser in 1921, and had only recently begun construction of the type with the laying down of the Lexington-class, it may be concluded that one purpose of the exercise was to gauge the material readiness of the Royal Navy in a not too distant future war.[108]

'C.B. 3011,' the 1929 war game rules, provided an example of a typical tactical war game scenario to be used. Though no enemy is expressly named, the United States can be inferred as Blue Fleet is composed of fourteen battleships and no battle cruisers.[109] Till observes that the Royal Navy did not seriously contemplate a war with the United States though it used such a possibility for planning purposes.[110] Given the steps the Service pursued in examining a possible Anglo-American war at Greenwich, the Tactical School, and within the fleet, this writer is more cautious. Such a war was probably not of primary

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[106]As a rule, 'C.B. 3011,' specified that Red should represent the British force in any engagement. The America and West Indies Station, however, conducted exercises where Blue represented the British force.

[107]Journal entry dated 17 January 1921, Elkins Papers, NMM/ELK/1.

[108]Ernest Andrade, 'The Battle Cruiser in the United States Navy,' Military Affairs, Volume XLIV, No. 1, February 1980, pp. 20-21.

[109]ADM 186/78, 'C.B. 3011,' p. 23.

[110]Geoffrey Till, 'Retrenchment, Rethinking, Revival, 1919-1939,' J. R. Hill, ed., The Oxford Illustrated History of the Royal Navy (Oxford: Oxford University Press, 1995), p. 328.

consideration, but worthy of secondary investigation. The fact remains however, that Anglo-American naval co-operation during the interwar period was deeper and was initiated earlier than is commonly held.

War with Japan. The possibility that Britain might have to fight a Japanese war troubled the Admiralty even before the termination of the Anglo-Japanese Treaty.[111] Such a war would be extremely difficult owing to the distances involved and their implications for logistics, the poor state of military infrastructure in the theatre of operations, and the known proficiency of the Imperial Japanese Navy, amply and ably demonstrated as recently as the Great War.[112] Of particular concern was the exposed position of Hong Kong and the means of rendering it secure, if the treaty were not renewed.[113] To secure Hong Kong, two alternatives were deemed feasible and neither of them were relished. A fleet could be maintained in the Far East capable of dealing with Japan or the port's defences could be strengthened to withstand a prolonged siege.[114] The Japanese occupation of nearby Canton in 1938 and Hainan Island in 1939 made defence of the colony even more

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[111]ADM 1/8608/121, Trade Division un-numbered memorandum to Deputy Chief of Naval Staff dated 30 June 1921.

[112]A cult, of sorts, in historical circles usually prescribes latent racism as the reason why the West misunderstood and under-estimated the Japanese threat. Whilst this writer accepts that individual officers may have held prejudices, institutionally the Service understood the threat all too well and respected Japanese military capabilities. This last point is emphasised by the conclusion that 'it should be remembered that the efficiency of the Japanese Navy was a powerful contributory factor to the making of the Anglo-Japanese Alliance in 1902.' From ADM 223/815, Confidential Admiralty Monthly Intelligence Report, No. 95 dated 15 April 1927, p. 28.

[113]ADM 1/8570/287, Plans Division un-numbered memorandum to War Cabinet dated 21 October 1919.

[114]Ibid.

problematic.[115]

For planning purposes, the Admiralty assumed such a war could occur at any time after 1 April 1929.[116] Until the completion of the Singapore Naval Base, the passage of the Main Fleet rested upon the adequate provision of oil reserves along the fleet's venue of approach and the use of improvised anchorages secured by the Mobile Naval Base Defence Organisation (MNDBO).[117] Exercise 'E.A.' conducted 17-20 January 1922, as the Atlantic Fleet sailed from Portland to Arosa Bay, tested the concept of escorting a convoy which included a Mobile Naval Base Ship.[118] The convoy formed, in part, by the carrier Courageous,[119] HMS Pandora, HMS Assistance, and HMS Sandhurst, was escorted by Red Fleet, a force composed of seven battleships, the First Light Cruiser Squadron, and two flotillas of destroyers in the face of Blue Fleet, a squadron of two battle cruisers, the Second Light Cruiser Squadron, two flotillas of destroyers, and submarines.[120] The Red Force objective was to replenish the mobile base established at Arosa Bay, represented by HMS Snapdragon[121] and HMS Maidstone and defended by mines, submarines, and a local defence

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[115]Peter Elphick, Far Eastern File: The Intelligence War in the Far East 1930-1945 (London: Hodder & Stoughton, 1997), p. 69.

[116]ADM 116/2457, Director Plans un-numbered minute dated 7 March 1927.

[117]Director Plans minute to Deputy Chief of the Naval Staff dated 3 November 1921, Tracy, ed., Defence of Empire, p. 309.

[118]ADM 116/2173, Commander-in-Chief, Atlantic Fleet letter No.257/A.H.1124 to Admiralty dated 27 February 1922.

[119]Commissioned 1925, displacing 22,500 tons, and capable of operating upwards of 35 aircraft.

[120]Midshipman Journal entry dated 18 January 1922 of G. C. C. Campbell-Johnston, privately held by author.

[121]Journal entry dated 17 January 1922, King Papers, IWM/90/23/1.

flotilla.[122] In exercise 'N.A.S.F.', held in Greek waters during August 1926, the practicality of the MNBDO in a full scale deployment was tested. As specialist ships did not exist to support the MNDBO, heavy ships and aircraft carriers were used to land the embarked forces.[123] Exercise 'N.A.S.F.' saw the use of eight battleships and the aircraft carrier Eagle.[124]

In December 1924 a ten day exercise was carried out at Salsette Island, Bombay to measure the feasibility of Japanese forces capturing Singapore in a 1926 war.[125] This hypothetical encounter assumed the arrival of the British main fleet 35 days after war's declaration.[126] The exercise concluded that the Japanese force could not secure Singapore prior to arrival of the British fleet, but Richmond, the Commander-in-Chief, East Indies, questioned the finding because the Japanese were not likely to spend 12 days building an advance aerodrome to support the assault as the exercise anticipated.[127] Meanwhile, the transfer of the Main Fleet to Far Eastern waters was tested by the Mediterranean Fleet in August 1925 in exercise 'M.U.'[128] The fleet left Argostoli, a port on the Greek

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[122]Journal entry dated 17 January 1922, Elkins Papers, NMM/ELK/1.

[123]Donald F. Bittner, 'Britannia's Sheathed Sword: The Royal Marines and Amphibious Warfare in the Interwar Years--A Passive Response,' The Journal of Military History, Volume 55, Number 3, July 1991, p. 355.

[124]Commissioned 1924, embarking upwards of 30 aircraft, and of 22,600 tons displacement.

[125]ADM 203/84, Admiralty letter M.0735/25 to President, Royal Naval College, Greenwich dated August 1925.

[126]Ibid.

[127]Ibid.

[128]ADM 1/8711/146, Plans Division minute 02771/27 dated 14 February 1927.

island of Cephalonia, on the evening of 17 August 1925,[129] and carried out a sortie representing passage through the Straits of Malacca under wartime conditions. Due to the casualties assessed in exercise 'M.U.,' the Plans Division recommended examining a fleet passage through the Sunda Straits.[130] In 1928, exercise 'M.U.2', beginning 15 March saw over 80 ships from the Mediterranean and Atlantic Fleets test the concept of securing a decisive fleet action before Hong Kong, represented by Gibraltar, and Singapore, represented by the Spanish island of Alboran off the western coast of Algeria, succumbed to Japanese forces.[131] The Royal Naval Staff College reviewed the general outline of the exercise and forwarded its appreciation to the Commander-in-Chief, Atlantic Fleet, playing the part of Blue Fleet, prior to the exercise's commencement.[132] Unlike the 1924 exercise held off Bombay, no provision was allowed for the 'Japanese' force to construct an aerodrome in the vicinity to support their operations.[133]

Until the Main Fleet's arrival from Home and Mediterranean waters, which was variously estimated in the absence of an ongoing European war at 28,[134] 35,[135] 42,[136]

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[129]ADM 116/2285, Rear Admiral, First Battle Squadron letter R.A.925/14 to Commander-in-Chief, Mediterranean dated 4 September 1925.

[130]ADM 1/8711/146, Plans Division minute 02771/27 dated 14 February 1927.

[131]Jackson, Strike from the Sea, p. 49.

[132]ADM 203/86, Director, Royal Naval Staff College letter S.C.4238 to Chief of Staff, Atlantic Fleet dated 2 March 1928.

[133]Ibid., Royal Naval Staff College, Greenwich, (Session 1927-1928), Precis of Scheme 159, p. 1.

[134]Jackson, Strike from the Sea, p. 49.

[135]ADM 203/84, Commander-in-Chief, East Indies to Admiralty letter No. 49/3202 dated 26 January 1925.

[136]ADM 1/8713/168, Admiralty letter M.01048/24 to Commander-in-Chief, East Indies dated 30 September 1924.

70,[137] and 90 days,[138] respectively, submarines were expected to prevent the Japanese Navy from securing local sea control,[139] and attacks on the Kure and Yokosuka naval bases were contemplated.[140] The likely composition of the Main Fleet in the event of an Anglo-Japanese war varied during the course of the interwar period, but its strength was built around the battlefleet. In 1921, the Admiralty anticipated operating 12 battleships and 8 battle cruisers in a war breaking out around 1930.[141] Following the Washington Naval Agreement, the Main Fleet sent East would be limited to nine battleships,[142] whilst up to four battle cruisers, depending on their availability, would most likely deploy to China.[143]

With the need to consider a German naval threat, a fleet-in-being strategy in Asia assumed greater importance. Previously, the Admiralty contemplated conducting sequential operations in widely separated theatres; now its aim was to forestall the possibility of such an approach being required. Thus, the Admiralty noted:

> ...it has been assumed that our aim in the Far East, as the war with Germany lasted, could only be to maintain the situation which existed when the Fleet got out to the

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[137]Committee of Imperial Defence, Chiefs of Staff Sub-Committee minute dated 4 June 1937, Tracy, ed., Defence of Empire, p. 568.

[138]Admiralty minute M.04403/1919 dated October 1919, Jellicoe Papers, British Library, Additional MSS 49,045.

[139]ADM 1/8616/213, Director of Plans minute P.D. 01644/21 dated 29 November 1921.

[140]ADM 1/8658/61, 'Harbour Attack by Submarines,' un-numbered dated 18 March 1924.

[141]First Lord memorandum dated 21 June 1921, Tracy, ed., Defence of Empire, pp. 293-294.

[142]ADM 1/8700/121, Director of Plans memorandum M.01619/25 dated 12 June 1925.

[143]ADM 116/2457, Plans Division minute P.D.02725/26 dated 7 March 1927.

East and prevent further offensive operations by Japan.
2. The Fleet required would therefore need to be strong enough to give covering protection to our trade in the East, to hold its own in a battle with Japan should she risk such a battle and to prevent her undertaking any major operation against Australia, New Zealand or Borneo so long as our fleet was in being. Our fleet should, however, be sufficiently strong to be able to afford the detachment of small forces to operate offensively with the object of harassing the Japanese Navy.[144]

In August 1933, Admiralty strategic planning had narrowed its focus to considerations of war with Japan only, though this estimate proved short-lived as other threats soon arose.[145] Again, common with its planning for other naval wars, the Royal Navy would attack Japanese maritime trade through a rigorous programme of visits and inspections of commercial shipping.[146]

British Naval Strategy Evaluated. Faced as it was with several different threats and widely dispersed theatres of operations, British naval strategy had of necessity to exhibit a measure of flexibility. What was an appropriate strategic response in one theatre was not a suitable course of action in another. This chapter, in examining the strategic setting of the capital ship has focused on the Service's plans with respect to individual naval powers, yet it is important to keep in mind that the conditions the Royal Navy faced in a new war might be materially different, depending on whether she fought as a

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[144]ADM 1/9081/53, undated and un-numbered 'Board memorandum on a New Standard of Naval Strength.'

[145]Commander-in-Chief, Mediterranean to Admiralty letter 0265/439/57 dated 27 September 1933, William Fisher Papers, NMM/FHR/16.

[146]ADM 186/71, 'C.B. 01759A(26), Supplement No. 1,' p. 1.

member of a coalition or against a coalition of powers.[147] Britain did not have the luxury of following a single, pure, strategic approach, be it command of the sea, fleet-in-being, or guerre de course, but, rather, practiced a maritime strategy that was an amalgam sharing aspects of each. Given a policy that defined a 'One Power Standard' of strength, British naval strategy was implicitly based on the need to conduct sequential operations in the event that more than one crisis arose. Further, her Far Eastern strategy, based as it was on deterrence through the maintenance of a fleet-in-being, placed a premium on intelligence. An early indication and warning of possible enemy action was pivotal, if the Main Fleet were to arrive prior to the loss of Hong Kong and Singapore. Anything that delayed the transit of the Main Fleet increased the time that British possessions must fend for themselves and increased the likelihood of their loss. Whilst the loss of Hong Kong might delay the offensive phase of British naval operations, the loss of Singapore and local sea control would prove nearly insurmountable.[148] An essential indicator of Japanese action was the movement of naval and merchant shipping as a precursor to offensive action. In 1932, the speed at which Japanese operations in China developed shocked the Admiralty, and the Commander-in-Chief, China was advised that adequate warning could not now be relied upon.[149]

British naval strategy during the interwar period was

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[147]The Royal Navy anticipated that action in war was likely to be a combined operation and exercised to that end. Exercise 'L.C.,' conducted 25-27 March 1928 off the coast of Spain by the Atlantic Fleet practiced the escorting of a convoy using the signalling procedures of the fleet's Allied Signal Manual and International Code. See entry dated 25 March 1928, Midshipman H. A. V. Haggard Journal, Haggard Papers, IWM/85/21/3.

[148]Admiralty memorandum dated July 1931, Tracy, ed., Defence of Empire, p. 447.

[149]Admiralty letter M.00505/33 dated 26 April 1933 to Commander-in-Chief, China, Roskill Papers, ROSK/7/164.

no longer the prerogative of a single service, but was increasingly a joint maritime strategy that was heavily dependent upon cooperation with the Royal Air Force and the British Army. The Admiralty's plans for war with France and Italy which assumed the active cooperation of the air force from the beginning in any conflict and the army's role in the defence of Singapore and Hong Kong are proof of this point. Further, naval planning operated within the context of a greater strategic planning organisation directed by the Committee of Imperial Defence; issues were considered on a global basis and in an imperial framework with Admiralty planning forming but a part the process. From a strategic standpoint, the capital ship was central only to a strategy that sought to command the seas. In any other variant of naval strategy practiced, the capital ship would be a supporting and not the pivotal arm--at least during the opening phase of hostilities. On this, Chatfield observed:

> The duty of the Battle Fleet in war, until the enemy battle fleet had been destroyed, was to hold a strategical position behind whose cover the offensive operations in which the nation was employed could be carried out.[150]

Still, until command of the sea was established, the risk existed that an enemy naval force would be at liberty to disrupt British trade, prevent the initial offensive moves by the Royal Navy, and threaten invasion. Destruction of the enemy battlefleet would ensure British command of the sea, and the vehicle for achieving such command was the British battlefleet. Of the differing naval threats posited--France, Italy, Spain, Germany, the Soviet Union, Turkey, Japan, and the United States--a common attribute was shared: each navy operated capital ships. Accordingly,

> Command at sea in the first place depends upon the ability to destroy or

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[150]Chatfield speech to the Institution of Naval Architects delivered May 1933, Chatfield Papers, NMM/CHT/3/6.

> neutralise the main naval force of an enemy, i.e., his battlefleet. If this cannot be done the latter will be able either to support his cruisers in operations against trade, make possible the passage of armies for the purpose of invasion or reinforcement or capture on his opponent's lines of communication.[151]

This much was recognised at an early date, but given the interwoven relationship of all naval forces this did not argue necessarily for the abandonment of the capital ship, as Admiral Fremantle[152] observed:

> There is, in my opinion, a great deal to be said for the abandonment of the capital ship, and for the maintenance of our naval power by destroyers, submarines, and light cruisers for distant stations. But this is a matter of high naval strategy and the fact that the capital ship has become more vulnerable does not affect the justification for her existence. This lies in her power to overcome smaller surface ships than herself, and in her consequent strategical function of supporting light cruisers, while light cruisers support destroyers, and the destroyers in their turn may be supporting mine-sweepers.[153]

That said, the Service modified the tactical training of the fleet based on the evolving nature of the strategic threat. Thus, with any eye toward Italy and her flotilla of Mas[154] boats, defence of the battlefleet against a combined air and motor torpedo boat attack was actively

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[151]Undated and unsigned Imperial Defence College lecture 'The Application of the Principles of Empire Defence,' Admiral Sir Gerald Dickens Papers, Liddell Hart Centre for Military Archives, King's College, London.

[152]Later Admiral Sir Sydney Robert Fremantle (1867-1958). Deputy Chief of the Naval Staff (1918-1919); Commander, First Battle Squadron (1919-1921); and Commander-in-Chief, Portsmouth (1923-1926).

[153]Deputy Chief of Naval Staff memorandum dated 24 January 1919, Fremantle Papers, NMM/FRE/313/71.

[154]Motoscafi antisommergibili.

practiced late in the period by the Mediterranean Fleet.[155] In a like manner, the tactics to counter a German commerce raiding group composed of two armoured ships of the Deutschland-class, a division of destroyers, and two submarines acting in unison were rehearsed.[156] Thus, the strategic assessment of who the enemy was and his presumed naval capabilities, drove the Service to train accordingly and precluded the ossification of tactical thinking.

Finally, in examining British naval strategy it must be stressed that, at times, it deviated from its operational doctrine and was out of step with what her sister Services could logistically support. An example of the first was the Naval Staff's planned use of the Fleet Air Arm in a war against either France or Italy. On such use, Admiral Sir Roger Backhouse noted that:

> The Fleet Air Arm is too small a force to be used frequently against shore objectives other than the enemy's fleet bases when his fleet is in harbour, and it is not designed for this duty. If it were so used, it would soon cease to exist as we are not likely to have reserves either of personnel or aircraft sufficiently to fill vacancies frequently.[157]

Moreover, when the Admiralty assumed that Main Fleet would not be available for use in Far Eastern waters until after 70 days of notice, the military garrisons of Hong Kong and Singapore maintained reserves of equipment, food, and ammunition of only 60 days.[158] Thus, it is now appropriate to examine the operational experience of the Royal Navy and the development of doctrine as elements of the capital ship controversy.

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[155]Journal entry dated 28 June 1938, Milford Haven Papers, IWM/DS/MISC/9.

[156]Ibid., entry dated 13 July 1937.

[157]ADM 1/9088/63, Backhouse letter to Cunningham dated 31 December 1936.

[158]Imperial Defence College, Exercise No. 10, 1937, Tennant Papers, NMM/TEN/42/4.

CHAPTER V

THE CAPITAL SHIP AND ITS OPERATIONAL EMPLOYMENT IN THE ROYAL NAVY DURING THE INTERWAR PERIOD

> [W]hile the demands for reductions and economies are made with growing insistence, the demands upon the Navy show no signs of decrease - quite the contrary.[1]
>
> Walter Long

> The Commandant of the local force of the State Military Police 'remarked that were it not for the presence of a British warship in the harbour, he would refuse to carry out his instructions and leave the town for it would be impossible to enforce order.
>
> The British flag, however, was a sufficient guarantee for him, were it hoisted on a battleship or a canoe.'[2]
>
> Commander Augustus Agar

The Treasury, with its almost constant refrain for fiscal restraint, and the various naval arms accords of the period defined the limits of the Royal Navy materially, whilst the First World War provided the Service with a benchmark against which to assess its doctrine, ships, men, and organisation. The Royal Navy, no less than the nation, could well rejoice when the Armistice ending the 1914-1918 war was proclaimed. For the officers and ratings of the Grand Fleet, the dismal solitude of Scapa Flow promised to be a thing of the past, and the dangers inherent in facing a major fleet action were, for the moment, no more. If

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[1]First Lord to War Cabinet memorandum titled 'Post-War Naval Policy' dated 12 August 1919 cited in Ranft, ed., Beatty Papers, Volume II, p. 54.

[2]ADM 1/8760/232, Commanding Officer, HMS Scarborough letter No. 7/32 dated 15 October 1932, p. 6.

celebrations were the initial order of the day, the surrender of the High Sea Fleet and its internment was the second, and operation 'Z.Z.,'[3] as the evolution was styled, was carried out on 21 November 1918. H. C. Burton, now serving in Neptune of the Fourth Battle Squadron, described the scene in a letter to his mother:

> All ships had their ensigns at the masthead (only flown in that position when in sight of the enemy) guns trained fore and aft ready for training on the enemy if necessary. When our leading ship reached the last ship in the German line she turned 16 points i.e. a half circle and returned on the same course as and parallel to the Germans and other ships following in her wake.[4]

The denouement of the Imperial German Navy was a bittersweet affair, and the regret of not decisively defeating the High Sea Fleet in a fleet action already commented on by Beatty in Chapter I was felt no less in the gunrooms of the Grand Fleet:

> Somehow I think we were all too sorry for their defeat to be cheerful and I know that I would have given anything if even at the last minute before they met us they had shown fight. I don't mean that I wanted them to suddenly turn on us but if they could only have sent a wireless signal saying they were going to fight to the last ship. I suppose this sounds bloodthirsty but the disappointment of being done out of

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[3]Concerning the significance of the 'Z.Z.' designation the following is cited: 'It has been customary in the fleet to distinguish the various operation orders with letters of the alphabet for purposes of reference, and when "Orders for Operation Z.Z." appeared, one felt that for once the staff had been really human in their choice of a title, and that surely THIS was indeed the END.' from H.M.S. Castor: Grand Fleet Destroyer Flotillas, 1915-1918; Souvenir of a War Commission (Glasgow: James MacLehose and Sons, 1919), p. 35, Officer's Steward Sidney Victor Clack Papers, Imperial War Museum, London, IWM MISC/1010/65/1. Original emphasis.

[4]Letter dated 21 November 1918, Burton Papers, IWM/81/13/1.

our scrap is awfully keen.[5]

Still, while a general war may have been terminated, the very nature of its ending had left many problems unresolved. Therefore, whilst the Royal Navy no longer had to contemplate a fleet action and the risk to its merchant shipping had been eliminated, it faced a plethora of operations in the war's immediate aftermath. Whether it was the occupation of Asia Minor, providing support to anti-Bolshevik forces in the Baltic and Crimea, clearing the many mines laid during the war, or providing support to colonial administrations, the Royal Navy returned to a pattern of operations not unlike its experience preceding the Great War and the rise of the German naval threat.

Certainly, many of these actions were minor in nature and quickly resolved themselves. Others proved to be more intractable and would fester for years and, at times, demand considerable naval resources. A measure of the Royal Navy's operational employment during the 1919-1939 period can be measured by referring to the table provided in Appendix III. Of course, not every crisis required the commitment of capital ships, and the use of a capital ship by itself may only indicate that it was the vessel most readily available in a given instance. Still, a cursory examination of Appendix III and Appendix IV highlights the diverse geographical commitment of the Navy, the areas of recurring problems, and the paramount need to maintain naval forces capable of the broadest capabilities while operating in the widest geographic milieu.

This chapter examines the operational employment of the Royal Navy during the 1919-1939 period with an emphasis on the role of the capital ship. It investigates the many tasks that the fleet was expected to execute measured against an escalating continuum of naval operations. This study does not purport to be a general examination of the

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[5]Ibid.

interwar period and considerations of space do not permit such a treatment in any event. Hence, it cannot address every naval operation and such operations that are addressed are for the purposes of illustration and amplification. Still, by concentrating on the role of naval forces and the part played by the capital ship, the analysis will illuminate the Royal Navy's actual commitment, or lack thereof, in the continuing primacy of the capital ship at the operational level. Accordingly, this chapter offers fresh insight into the capital ship controversy from an operational perspective. First, though, a discussion on a theoretical model defining the continuum of naval operations is in order.

A Theoretical Continuum of Naval Operations. The scope of naval operations ranges from missions of routine peacetime presence to the waging of general war, with a series of escalatory steps between the two extremes. Arnott and Gaffney have defined a scale beginning with peacetime presence, to surveillance and the showing of force, and culminates with the use of naval force.[6] For the purposes of this study, the Arnott and Gaffney definition is insufficient, as it neglects some aspects of lesser naval operations where the application of force is aimed at an internal threat rather than an external foe. Such aspects include support to Home and colonial governments in maintaining domestic order and lending support to civil authorities during periods of labour unrest. In addition, Arnott and Gaffney fail to distinguish between missions of naval presence conducted in a benign environment of allied or neutral waters, and what Cable refers to as 'showing an unfriendly flag'; the exercise of freedom of navigation, in an area of disputed sovereignty.[7] Still, if the Arnott and

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[6]Ralph E. Arnott and William A. Gaffney, 'Naval Presence: Sizing the Force,' Naval War College Review, March-April 1985, pp. 18-30.

[7]James Cable, Navies in Violent Peace (Basingstoke: MacMillan, 1989), p. 72.

Gaffney model is accepted as a starting point and is broadened including the aforementioned caveats, then a more appropriate continuum can be defined. With missions of naval presence at the lowest end of the scale, it terminates with the waging of general war at its summit. Between these two extremes lie surveillance, the application of naval force in support of domestic order, the showing of force for purposes of deterrence, the execution of limited naval strikes, and the application of naval force in support of limited war. This then is the yardstick by which the Royal Navy's capital ship operations will be measured.[8]

It is important to understand that the naval tasks which comprise the continuum are not mutually exclusive. Given the dispersal of naval forces and the object of each naval task, it is possible for naval operations, at a given moment, to span the entire range of the continuum. In addition, it may be remarked that reference to the continuum lends itself to applying the concept of economy of force--an accepted principle of war.[9] Economy of force, at the operational level, argues for the minimum allocation of combat force necessary to secure secondary objectives. As the capital ship was admittedly the premier naval

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[8]It is not to be inferred that this model represents the sum total of naval responsibilities. Other tasks can be identified such as survey and hydrographic research. These tasks, their importance conceded, do not involve the application of force. As such, their omission does not detract from the model adopted. For an exposition on contemporary Royal Navy doctrine see The Fundamentals of British Maritime Doctrine: BR 1806 (London: HMSO, 1995).

[9]Many works discuss the 'principles of war' and the pitfalls of such thinking. On the latter aspect, see Bruce Kenner, III, 'The Principles of War: A Thesis for Change,' Proceedings, November 1967, pp. 27-36, This writer relies on the concept of economy of force as defined in U.S. Army Field Manual 100-5 Operations, May 1986. The best recent discussion on the principles of war with respect to naval warfare is Wayne Hughes' Fleet Tactics whilst Corbett's Some Principles of Maritime Strategy provides an initial intellectual foundation.

warship of the period, its employment in minor naval tasks raises the issue of whether the concept of economy of force was understood within the fleet and the Admiralty, or whether it has relevance in peacetime operations. The strongest reply this writer can offer is that all operations, even peacetime evolutions, have to be measured against the expected risk, and the officers of the Royal Navy made calculations based on the concept of economy of force.[10]

Finally, a caveat must be voiced. The model selected for use in this study would have been alien to British naval officers of the 1919-1939 period. Such a regulated thought process about naval warfare is a contemporary phenomenon. Moreover, it is by no means claimed that this is the only model available to evaluate the capital ship from an operational perspective. An evaluation of the battleship and the battle cruiser from the perspective of the various naval tasks associated with sea control is certainly one such alternative.[11] Further, whilst an analytical approach built upon a series of case studies remains another theoretical approach, this method has been discounted as impractical given considerations of space.

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[10]ADM 1/8588/81 on the last point includes a detailed outline of what topics should be addressed in devising Admiralty War Plans. Part V, Operations, of the outline specifies a series of discrete tasks to be executed by naval and air forces. Implicit in the outline is the concept of economy of force. Richmond's lectures on Tactics and Strategy, RIC/10/1 and RIC/10/2, National Maritime Museum, Greenwich include a discussion of most of the accepted principles of war including economy of force. ADM 186/66, 'C.B. 973, Naval War Manual, 1925,' Admiralty, Naval Staff, Training and Staff Duties Division dated October 1925 specifies eight principles of war: maintenance of the object, offensive action, surprise, concentration, economy of force, security, mobility, and co-operation.

[11]See Joseph A. Moretz, 'Liddell Hart and Naval Warfare: The Missing Dimension,' Jack Sweetman et al., eds., New Interpretations in Naval History: Selected Papers from the Tenth Naval History Symposium (Annapolis: Naval Institute Press, 1993), pp. 271-292.

The value of the model selected is that it allows an evaluation to be conducted against recognised naval tasks during a period noted for its absence of general war. Thus, it will facilitate assessing the capital ship's continuing operational viability during the period in question.[12] In examining the operational employment of the capital ship this writer will be particularly guided by reference to how contemporary naval officers assessed its contribution in performing the various naval tasks described.

As naval operations are tied to the logistical infrastructure and the fleet organisation that sustain and control them, an overview of the Royal Navy's fleet organisation is warranted prior to an assessment of the capital ship's place in the continuum of naval operations.

The Royal Navy Fleet Organisation of the Interwar Period. The Grand Fleet survived the war long enough to allow a newly promoted Beatty to fly the Union Flag signifying his promotion to Admiral of the Fleet. Four days after his promotion in April 1919, though, the Grand Fleet was disestablished and a much reduced Atlantic Fleet took its place.[13] The Plans Division of the Admiralty had been contemplating the size of the postwar Service even whilst the military issue was still in doubt. To this end, a navy composed of thirty-three capital ships, of which, twenty-three would be in full commission was envisioned.[14] Nine late model pre-dreadnought ships, all with varying degrees of reduced manning, and five seaplane carriers in full commission would also be retained.[15]

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[12]Viability in this instance is not to be confused with survivability. The chapter on tactics will address the extent to which the capital ship was viewed as survivable.

[13]Gordon, Rules of the Game, p. 538.

[14]ADM 1/8549/1, Plans Division memorandum P.D. 1223 dated 13 July 1918.

[15]Ibid.

By February 1919, the ten ships of the Queen Elizabeth and Royal Sovereign-classes, the one-off Canada,[16] and all of the Service's active battle cruisers save one were tentatively identified for service in a newly styled Atlantic Fleet. A Mediterranean Fleet was to be formed around battleships of the Iron Duke and King George V-classes, while six partially manned battleships of the Orion and King George V-classes were to make up a newly styled Home Fleet.[17] New Zealand was scheduled for the China Station, and the balance of a further twelve capital ships were to be assigned to the Reserve Fleet based at Portsmouth, Chatham, Devonport, Cromarty, Rosyth, and the Humber.[18]

Such planning had very much an element of wishful thinking about it, and the pressures for further economies moved the Admiralty to reconsider their capital ship plans. In September 1919, the best that could be anticipated was as an active force in the Atlantic Fleet of ten battleships and four battle cruisers and a Mediterranean Fleet of six battleships. The Home Fleet was eliminated and its units transferred to the Reserve Fleet on 1 October 1919;[19] the Reserve Fleet was to be further rationalised by eliminating the capital ships planned for Cromarty and the Humber.[20] In

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[16]Canada, originally built for the Chilean Navy, had been taken over by the Service during the war. Initial post-war efforts to transfer the ship to Chile to realise economic savings were hindered by Britain's obligations to the Arms Traffic Convention signed in Paris on 10 September 1919. The ship was eventually transferred to Chile in November 1920; see ADM 1/8570/281.

[17]ADM 1/8549/1, Admiralty memorandum M.06366 dated February 1919.

[18]Ibid. One ship not addressed in the Admiralty's postwar calculations was Australia, a heavy ship of the Royal Australian Navy.

[19]ADM 1/8590/101, Admiralty letter M. 010118. dated 27 September 1919 to Commander-in-Chief, Home Fleet.

[20]ADM 1/8549/1, Admiralty memorandum M.03710 dated 11 September 1919.

1922, the Reserve Fleet underwent further economies when it was reorganised into three divisions based at Portsmouth, The Nore, and Devonport.[21]

In addition to its two main fleets (Atlantic[22] and Mediterranean) and several administrative Home commands (The Nore, Portsmouth, Devonport, Portland, Coast of Ireland, and Coast of Scotland) the Royal Navy maintained forces on distant stations including the North America and West Indies, China, East Indies, South America, Africa, Australia, and New Zealand.[23] The forces assigned to the distant stations were primarily composed of cruisers, destroyers, submarines, and attendant supporting craft, with a cruiser serving as a flagship to the Commander-in-Chief of the Station or the Senior Naval Officer present. An exception to this general pattern was the China Station where a small aircraft carrier, numerous gunboats, and sloops were frequently deployed to support riverine operations, and the Australian station, where the Indefatigable-class battle cruiser Australia was assigned.[24]

Thus, capital ships, as a rule, did not operate on the lesser Stations. This failure to routinely employ capital ships can be ascribed to operational, logistical, political, and financial reasons, and no reason by itself forms a sufficient answer. Operationally, battleships were assigned to a squadron of similar type vessels and formed the striking arm of the main fleet; their concentration

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[21]ADM 1/8619/15, Admiralty Fleet Order 949, 'Reserve Fleet Reorganisation' dated 7 April 1922.

[22]The Atlantic Fleet was redesignated the Home Fleet in March 1932.

[23]The South American Station was eliminated and its area of responsibility included in a newly styled America and West Indies Station in 1921. See First Lord memorandum to Cabinet F.C.72 dated 28 February 1921, ADM 1/8598/14.

[24]Until, that is, it was disposed under the terms of the Washington Naval Treaty of 1922.

into a battlefleet was dogma.[25] Detaching a unit from its squadron for a prolonged deployment was disruptive to it and the squadron's operating cycle, impacted the ship's training regime, and required a period following the deployment for the ship to become an effective and efficient unit once more.[26] When a capital ship was detached for such an operation, it was typically a battle cruiser. For battle cruisers, the disruption of independent cruises was no less present, but, operationally, the Royal Navy accepted that such naval vessels in war could be expected to operate away from the main fleet. Thus,

> Battle cruisers will be useful in waters remote from the main theatre of operations, as they are capable of dealing with all types of surface vessels other than battleships, which are not likely to be employed on outlying operations.[27]

Nonetheless, such cruises were disruptive, and, in this regard, Renown's visit to the Far East in 1921-1922 is illustrative. Gun drill during the tour of the Prince of Wales was infrequently held. To wit:

> 4" triples went to drill. I got on fairly well with my gun (S II) but there does not appear to be any drill laid down for these guns, and no-one in the ship knows much about them.[28]

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[25]ADM 1/8605/81, Admiralty memorandum E.4 regarding 'Empire Naval Policy and Co-operation' dated February 1921, p. 12.

[26]See ADM 1/8628/120, Director of Training and Staff Duties un-numbered minute dated 26 November 1921 to the paper 'Peace Distribution of the Fleet.'

[27]ADM 1/8605/81, Admiralty memorandum E.4 regarding 'Empire Naval Policy and Co-operation' dated February 1921, p. 12,

[28]Journal entry for 14 December 1921, Barnard Papers, IWM/P255. See also the letters written by Tennant serving in Renown during the same cruise, Tennant Papers, National Maritime Museum, Greenwich, NMM/TEN/6.

A condition not at all unlike that experienced by New Zealand during her world cruise of 1919-1920. Gun drill was held infrequently and the results obtained were often disappointing. John Hammill, the ship's Gunnery Officer, recorded of one practice that, 'Q turret pretty good, remainder awful. Misfiring and bad drill or more likely, lack of drill. X turret especially bad.'[29]

Moreover, when capital ships were employed on such high profile tours, it was typically the case that the ships were taken in hand to enhance their arrangements at the expense of their fighting qualities. Thus, in preparation for her 1919-1920 voyage, New Zealand's forward 4-inch guns were removed to provide extra accommodation for Admiral and Lady Jellicoe and the range clocks eliminated,[30] whilst Renown's flying-off platforms were removed from 'B' and 'Y' turrets and the after 4-inch mount withdrawn to improve the habitability for the Prince of Wales during his tours of the 1919-1922 period.[31]

Logistically, supporting capital ships was a difficult proposition in the absence of adequate docking and maintenance facilities and the infrastructure to support the provision of fuel oil. Hence, the vital importance of developing Singapore as a fleet base and anchorage for the Far East, if the Navy was to meet its extra-European defence commitments. Outside of the United Kingdom and the facilities at Gibraltar and Malta, the only naval dockyards in the Empire capable of supporting capital ships were located at Durban, South Africa and Esquimalt, Canada. Nor could the Admiralty contemplate using the commercial

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[29]Diary entry dated 15 July 1919, Hammill Papers, IWM/92/18/1.

[30]Cruises of H. M. S. "New Zealand" on Naval Mission to India and the Dominions, Volume I (Ottawa: Simmons Printing, 1919), p. 10 and Burt British Battleships of World War One, p. 102.

[31]Bill Johnson, 'HMS Renown,' Warship World, Vol. 5, No. 1, Winter 1994, p. 18.

dockyards of the Empire; the only one able to handle capital ships was located in St. John, New Brunswick.[32] Even the facilities found on the Mediterranean Station were not all that could be wished for by a navy operating capital ships. Summarising the results of the Atlantic Fleet's 1920 Spring Cruise Admiral Madden could write that, 'The inadequacy of Malta and Gibraltar for coping with large modern battlefleets, either as regards berthing, docking or removal of guns has become very apparent.'[33] The problem of dockyard support was not due to a lack of foresight on the Admiralty's part so much as the state of financial stringency and the tendency for all classes of warships to become larger than their predecessors. During the late war, the need to provide better anti-torpedo protection was recognised and one remedy adopted was to provide bulges along the hull of capital ships. Unfortunately, this increased the beam of the ship and made many of the existing docks obsolescent. Eventually, the limited facilities of Malta cited by Madden were augmented by providing an ex-German floating dock.[34] This measure, though, was not completed until 1926 as the dock to be used, Kiel No. 8, had to be modified.[35]

Yet, valid as Madden's observations were, and notwithstanding the importance of developing adequate basing facilities in the Pacific, it is important to realise that even the dockyard facilities found in Britain were wanting. On this point, Field whilst serving as Third

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[32]Precis of a 1934 Royal Naval Staff College, Greenwich lecture by Commander J. F. Stevens on 'Bases, II', in Oliver-Bellasis Papers, NMM/BEL/151.

[33]ADM 1/8586/68, Report of Proceedings of Atlantic Fleet Spring Cruise, 1920 letter No.374/A/H.1186. dated 22 March 1920.

[34]ADM 1/8616/218, comments by Director of Operations Division to P.D.01667/21 dated 10 December 1921.

[35]N. J. M. Campbell, 'Washington's Cherrytrees: The Evolution of the British 1921-22 Capital Ships,' Warship, Volume II, pp. 13-14

Sea Lord and Controller observed that:

> The Board have already approved a policy of bulging all ships of "QUEEN ELIZABETH" Class at as early date as circumstances will permit, and our present resources for docking these ships are limited to Portsmouth and Rosyth. In a few years' time there will presumably be in the Fleet the two new battleships,[36] "HOOD", "RENOWN", "REPULSE", 5 "ROYAL SOVEREIGNS", 5 "QUEEN ELIZABETHS", none of which will be able to dock at Chatham or Devonport when bulged, and only two at most can be docked at one time at Portsmouth.[37]

Politically, the distribution of the Royal Navy, including its capital ships, was very much tied to areas where Britain possessed substantial imperial interests, and one reason why other stations, such as China and Australia, were not favoured as a forward base for capital ships was because political instability was so acute in the Eastern Mediterranean for much of the period under investigation.[38]

As for considerations of finance, Chapter Two has discussed at some length the extreme fiscal pressures that faced the interwar navy. Still, two additional observations are provided. The pressure to economise was at times taken to excessive lengths by an Admiralty Secretariat fearful of a powerful Treasury Department. When Madden suggested deferring the paying off of a capital ship as his fleet had yet to use its full allowance of fuel owing to spending more time in port as a result of 'U.C.'

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[36]Nelson and Rodney.

[37]ADM 1/8637/54, un-numbered minute dated 23 January 1923.

[38]See ADM 1/8628/120, Captain G. Hamilton, 'Peace Distribution of the Fleet.' Hamilton, at the time of the papers preparation, was an instructor at the Royal Naval College, Greenwich.

duties,[39] he was reminded that sanction existed for maintaining only twelve capital ships irrespective of their actual running costs.[40] As the pressure to economise continued throughout the 1920's, the Service was forced to reorganise the deployment pattern of its capital ships between the Atlantic and Mediterranean Fleets. In 1926, the Mediterranean Fleet was reduced from eight battleships to five, while the Atlantic Fleet was increased from four to six battleships,[41] and for a time only one of the Atlantic Fleet's battleships, Revenge, was fully manned.[42] Thus, a regular regime of capital ship operations outside of Home waters (that part of the Atlantic from England to the north coast of Africa) was not an option for most of the period under discussion. Still, if capital ships were not regularly assigned to the distant stations of the Royal Navy, they did make periodic visits throughout the period in question. Typically, such visits were made in conjunction with a significant local anniversary or event. It is this aspect of naval operations, the employment of the capital ship in executing a mission of naval presence, that will now be examined.

Missions of Naval Presence During the Interwar Period. The association of naval forces as an extension of a nation's foreign policy has long been recognised, and, indeed, the phrase 'gunboat diplomacy' summarizes, if only in a crude manner, one particular aspect of missions of naval presence. Naval missions of presence routinely involve nothing more than 'showing the flag' on a distant station. By such means, a country simply conveys a message

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[39]Scheme 'U.C.' was the designation for the provision of naval and military support to the Home Government during periods of civil unrest.

[40]See ADM 1/8599/18, Admiralty to Commander-in-Chief, Atlantic Fleet letter M.31928 dated 30 August 1921.

[41]Oliver 'Recollections, Volume II', p. 288, Oliver Papers, NMM/OLV 12.

[42]Ibid.

that an interest, of sorts, is present. For Britain in the postwar period, the Royal Navy conducted such operations as a tangible sign of the ties of Empire, as an indication of political friendship with other states, to further its economic interests, and to assist expatriates when disturbances in a third country arose. Further, while it is the case that missions of naval presence are sometimes conducted to assert a right of passage in waters of disputed control, this aspect of naval operations is more familiar in the post-1945 era.

Prior to the Great War, the Royal Navy had concentrated its forces in Home waters to deal with the rising German naval threat. With the war's end, the Navy sought sanction to return to its previous policy of maintaining forces in areas of substantial British interests. In a memorandum to the War Cabinet, Walter Long,[43] the First Lord, reminded his colleagues that:

> An attack by Germany in the North Sea was, as we now know, rightly regarded as the risk which overshadowed all others; and therefore our Navy was built for this particular work - and we largely abandoned the policy which had previously been pursued of 'showing the flag' in foreign and other waters. The information which reaches the Board of Admiralty from many quarters convinces us that the time has come when it is necessary that the White Ensign should be seen in all these places.[44]

Capital ships were to feature prominently in these evolutions and, in so far as such a warship represented the United Kingdom, their use was often deemed vital. Commenting on the impression New Zealand had made at Bergen, Norway when it arrived to transport Queen Maud and

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[43]Walter Hume Long (1854-1924); Conservative politician; First Lord of the Admiralty (1919-1921); Created 1st Viscount Long of Wraxall (1921).

[44]Walter Long to War Cabinet memorandum titled 'Post-War Naval Policy' dated 12 August 1919 cited in Ranft, ed., Beatty Papers, Volume II, pp. 53-54.

the Crown Prince to Britain in December 1918, one official noted:

> I have been credibly informed, since my return to this country, that the arrival of H.M.S. Battle Cruiser "New Zealand" in the middle of December to convey the Queen of Norway and Crown Prince Olaf to England created a profound impression in Bergen, especially among the working classes and the Socialist. This visit, coming as it did, after the complete collapse of the German Navy brought home to every Norwegian the fact of our complete victory and also the fact that Great Britain continued to take the warmest interest in Norway. I venture to state the considered opinion that the dispatch of this fine cruiser to fetch Her Majesty was entirely justifiable and advisable not only from the dynastic point of view but more especially from that of British interests.[45]

There is a bitter irony in Findlay's comments. British attempts at securing Norway as an ally during the late war had foundered when that state concluded that the Royal Navy could not protect her from Germany.[46] Still, New Zealand's experience was mirrored when elements of the Battle Cruiser Squadron toured the Baltic region in the summer of 1920. In an official assessment regarding the Squadron's stay in Sweden, it was remarked that:

> The recent visit of H.M. Ships Hood (flying the flag of Rear-Admiral Sir Roger Keyes, K.C.B., K.C.V.O., C.M.G., D.S.O.) Tiger and destroyers was an unqualified success. The King of Sweden, the Premier and Minister for Foreign Affairs were most enthusiastic, and the King was much touched at the mark of attention shown in having his flag flown as a British Admiral when on board H.M.S. Hood. Great publicity was given to the visit in the Press and the comments were distinctly friendly; incidentally the visit has had an

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[45]ADM 1/8551/43, Political Report No. 12 by Sir Mansfeldt de Cardonnel Findlay to Earl Curzon dated 4 February 1919. Maud was the sister of George V.

[46]David French, British Strategy and War Aims 1914-1916 (London: Allen & Unwin, 1986), p. 29.

> excellent effect on banking and commercial circles.[47]

The interwar period is noteworthy for the number and diversity of such visits by capital ships, in general, and by battle cruisers, in particular. Appendix V highlights the use made of capital ships in 'showing the flag' during the interwar period to countries, dominions, and colonies not regularly visited by units of the Atlantic, Home, and Mediterranean Fleets. Arguably, such visits by a capital ship did not always achieve the results intended. At times, the visits served as a catalyst for igniting local discontent while on other occasions they could be reduced to farce. During Renown's time in Indian waters in 1921, strikes and rioting had broken out in Bombay whilst the Prince of Wales was visiting, leaving one witness to record:

> There were some disturbances in the town during the day, and although Gandhi's efforts to boycott HRH's drive through the streets yesterday were a failure, owing to the loyalty of the great mass of natives, there is no doubt that his propaganda has had an effect. His effort to spoil the illuminations in the town by declaring an electrician's strike, failed completely.[48]

Still, not all Indians were ill-disposed to the visit, and Barnard continued his narrative with the observation that when the Prince departed Bombay for Baroda he 'was given a splendid send off by the loyal population, who wanted in some measure to atone for the riots which rather marred his visit.[49] Moreover, some local dignitaries were exceedingly generous in welcoming such port calls. A feature noted by the Commander-in-Chief, East Indies when he reported:

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[47]'Confidential Monthly Intelligence Report,' No. 15, 15 July 1920, p. 17, Richmond Papers, NMM/RIC/4/1.

[48]Journal entry 18 November 1921, Barnard Papers, IWM/P255.

[49]Ibid., entry dated 22 November 1921.

> "RENOWN" is at present cruising in the Persian Gulf; she returns to Bombay on the 19th December, when arrangements are being made to send her crew in two watches on a visit lasting a week to Agra and Delhi; the cost of this visit is being borne almost entirely by a local Parsi gentleman.[50]

However, the goodwill generated by a capital ship visit was a tenuous thing, and it could come to grief for reasons other than the reception provided by the local populace. When Hood and Repulse visited Rio de Janeiro in September 1922, also in attendance to celebrate Brazil's centenary of independence were three Japanese cruisers and the American battleships Maryland[51] and USS Nevada.[52] With the American presence growing both materially and commercially in South America,[53] the Royal Navy was anxious to show itself in the best light, and, to this end, the customary courtesies of shipboard dinners and dances were held. Sports competitions were also arranged between the ships' companies and

> In every race our competitors walked through, the Japanese and the Americans being nowhere. That is the sort of thing which raises British prestige, which has suffered here just lately at the hands of the Yanks.[54]

A result that the Americans, unfortunately, were not of a mind to see repeated in the ring, and Elkins recorded the following incident:

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[50]ADM 1/8616/221, Commander-in-Chief, East Indies Report of Proceedings letter No.881/025D to Admiralty dated 16 December 1921.

[51]Completed in 1921 and armed with eight 16-inch guns.

[52]Completed in 1916 and armed with ten 14-inch guns.

[53]On the background to this rivalry, see Mary Klachko, 'Anglo-U.S. Naval Competition, 1918-1922,' Unpublished Ph. D. Dissertation, Columbia University, 1961.

[54]Journal entry dated 9 September 1922, Elkins Papers, NMM/ELK/1.

At 2100 the boxing competition between the American Squadron & ourselves took place. There were eight fights all told, one of which, the heavy weights, was called "no fight", since the American competitor knocked out Sto P.O. Spillar while shaking hands at the beginning of the first Round. This nearly brought the house down and it looked as if the situation might develop into a roughhouse.[55]

In the end, the American admiral was forced to apologise for the misconduct of his sailors, and Maryland and Nevada departed Brazilian waters earlier than planned. An incident of more serious import was Rear Admiral Field's remarks in Victoria, British Columbia during Hood's visit to Canada. Field remarked that the operation of four cruisers by the Dominion would be an appropriate measure given her dependence on overseas trade and the expansion of Asiatic countries;[56] his comments drew fire from critics on both sides of the Atlantic as it touched upon an issue of policy.[57]

It has already been remarked that battleships as a rule were not employed in such high profile visits to the distant stations. Still, departures from this pattern did occur and included the use of Malaya to transport the Duke of Connaught to India in January 1921, and the visit to Thingvalla, Iceland by Rodney in June 1930 in commemoration of the Althing's millenary.[58] Moreover, from 1931 visits to the West Indies by Atlantic and Home Fleet heavy ships

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[55]Ibid., entry dated 11 September 1922.

[56]ADM 116/2256, Field as cited in Daily Province, 2 July 1924. Field was not the only officer to fall foul of Canadian sensitivities on naval matters. Captain H. W. Parker, the commanding officer of Repulse, was forced to issue a retraction over comments made whilst visiting Halifax, Nova Scotia.

[57]Ernle B. Bradford, The Mighty Hood: The Life and Death of the Royal Navy's Proudest Ship (London: Hodder & Stoughton, 1959), p. 87.

[58]Journal entry dated 26 June 1930, Beaufoy-Brown Papers, LHCMA; the Althing is the Icelandic parliament.

became an accepted practice. Yet, if battleships did not routinely operate on the distant stations of the Royal Navy, they were feted by the visits of foreign dignitaries, and the backdrop of the Atlantic Fleet was frequently employed when foreign leaders toured the United Kingdom. Representative of this role was the visit of the King and Queen of Afghanistan in April 1928 when no less than five battleships and three battle cruisers were assembled.[59]

Turning to the matter of 'showing an unfriendly flag,' it has been remarked already that freedom of navigation operations were of lesser importance in the interwar era. Still, in one instance of the period, the Royal Navy went to extraordinary lengths to maintain the principle of free maritime passage and vigorously 'showed an unfriendly flag'. From the end of the 1914-1918 war until the Treaty of Lausanne,[60] the Eastern Mediterranean was an area of acute turmoil, and, culminating with the Chanak crisis of 1922, it nearly led to war between Turkey and Britain. Ultimately, with the Treaty of Sèvres,[61] Britain secured the internationalisation of the Turkish Straits and commenting on its terms, Laird has written that 'the British were the leading protagonists of a treaty for Turkey which was humiliating even by the standards of 1919-20'.[62] Still, prior to the treaty, Turkish resistance was anticipated and:

> The situation in Constantinople is

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[59]The battleships were Nelson, Rodney, Iron Duke, Benbow, Marlborough, and Emperor of India whilst Hood, Repulse, and Renown were the battle cruisers present. Blake Papers, NMM/BLE/4.

[60]Signed 24 July 1923.

[61]Signed 10 August 1920 and formally ending the First World War with Turkey; see René Albrecht-Carrié, A Diplomatic History of Europe Since the Congress of Vienna (New York: Harper & Row, 1973).

[62]Michael Laird, 'Wars Averted: Chanak 1922, Burma 1945-47, Berlin 1948,' The Journal of Strategic Studies, Volume 19, Number 3, September 1996, p. 343.

serious and very urgent. It is anticipated that violent resistance will be offered to the Terms of Peace and steps are being taken to strengthen the Allied position, as by showing a strong front at the commencement, it is hoped that the chances of over-awing any resistance will be greatly enhanced....

There at present at Constantinople - 8 Battleships, 1 Light Cruiser, 10 Destroyers, 3 Sloops and 1 Seaplane Carrier.

Arrangements have been made to land 2,000 men from the Fleet.[63]

In fact, a series of naval landings were conducted on the Turkish coasts with reinforcements provided by the Atlantic Fleet. Amongst the ships participating in these demonstrations was Ramillies, and one midshipman recorded that:

> Seaman & Marine's (sic) battalions landed at 7.45.a.m., & marched through Stamboul across the Golden Horn, & returned at 11.30.a.m. having marched 4 miles. The march was carried out under very favourable weather conditions, & from reports made a great impression on the Turkish & other native inhabitants.[64]

Certainly, one consideration for Britain in seeking to maintain unfettered access to the Straits was her ongoing support of anti-Soviet operations in the Crimea. Simply put, projecting naval power against the Soviet Union would not have been possible, if Turkey had been allowed to control the Straits. Finally, it must be remarked that what started out as a naval demonstration, quickly evolved into a mission of deterrence, and culminated with a series of limited naval strikes.

How then are we to measure the contribution of the

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[63]ADM 1/8578/6, Director of Operations (F), 'Report on Matters of Naval Interest, Week Ended, 13th March,' dated 15 March 1920.

[64]Midshipman Journal of T. L. Metters entry dated 24 February 1920, Lieutenant Commander Thomas Lee Metters Papers, Liddell Hart Centre for Military Archives, King's College, London.

Royal Navy's capital ships in executing the task of peacetime naval presence? If judged only by their frequency, the Admiralty placed great credence in the special value that a capital ship lent to a royal tour; this, notwithstanding, the disruption that such use had on a ship's fighting efficiency. Moreover, that capital ships operating off Spanish waters during the civil war were recalled for the express purpose of participating in the Coronation Review of 1937 provides some indication of the importance the Admiralty attached to these evolutions. Certainly, there was an element of prestige involved, and the Navy was wont to capitalize on this. Afterall, it was the Royal Navy and not the British Navy.[65] Furthermore, at a time of deep retrenchment in defence spending, such evolutions were a potent reminder to the public and to the Treasury of the utility of naval forces, an important fillip to crew morale, and a highly visible affirmation that the Royal Navy was a blue-water navy. If measured only by their popularity and the enthusiasm that they generated, such evolutions were extremely effective. One estimate is that during the Empire cruise of 1923-1924, the Special Service Squadron[66] was visited by nearly 250,000 people during its stopovers at Honolulu, Vancouver, and Victoria.[67]

Yet, such displays of British naval prowess sometimes generated a political cost. The Foreign Office objected to the 1931 visit of Atlantic Fleet heavy ships to the West Indies because of concern over possible American reaction,

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[65]The Navy's sensitivity to its prestige is highlighted by the decision to forsake the use of the pre-dreadnought HMS Lord Nelson as a target ship and to employ Agamemnon instead. See Deputy Chief of Naval Staff memorandum dated 19 February 1919, Fremantle Papers, NMM/FRE/314/138.

[66]Formation composed of Hood, Repulse, and attendant vessels.

[67]Bradford, The Mighty Hood, p. 84.

while the Spithead Review of 1924 inflamed French opinion.[68] To wit,

> The French Press contains hostile criticism of the British Naval Review. It is noted that 196 war vessels took part, and surprise is expressed that such a demonstration of Britain's Naval Power should be sanctioned by a Labour Government, which professes to be working in the interests of peace and general disarmament. The Prime Minister is accused of keeping his pacificism as an "article for export only."[69]

The Admiralty balanced the use of capital ships in support of missions of naval presence with the operational requirements of the Service. Whilst the Coronation Review of 1937 took place against the backdrop of the Spanish Civil War, it was not held at the expense of the Service's ongoing commitment to that crisis. Unlike the review of 1935, the Mediterranean Fleet was not totally denuded of capital ships, and, indeed, Royal Oak of the Home Fleet was especially retained near Spanish waters and missed the review.[70] Moreover, it is important to recall that the review of 1935 was held prior to the beginning of the Abyssinian crisis with Italy. Finally, when in the spring of 1939 plans were being formulated for a tour of Canada by George VI and Queen Elizabeth, the decision was made to use a commercial liner rather than Repulse as the Navy could not spare the battle cruiser.[71]

Of course, it would be misleading if it was left unremarked that other ships--particularly cruisers and

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[68]'Narrative of Command, Volume VII,' Haggard Papers, IWM/85/21/2, pp. 35-36.

[69]ADM 223/812, 'Confidential Admiralty Monthly Intelligence Report,' No. 64, dated 15 August 1924, p. 9.

[70]See Commander-in-Chief, Home Fleet to Rear Admiral, Second Battle Squadron signal (0012) received Royal Oak 0145 20 May 1937, Peachey Papers, NMM/PCY/3.

[71]Edward Parry letter to his wife dated 25 April 1939, Admiral Sir Edward Parry Papers, Imperial War Museum, London, IWM/71/19/9.

destroyers--were no less involved in conducting missions of naval presence. Given the naval forces assigned to the distant stations, such vessels were very much the dogsbody of such evolutions. Moreover, if a stay was contemplated at a port with restricted facilities, a successful visit might require the use of a less substantial warship. Following one battleship's visit her captain advised that:

> 17.- Although the authorities had gone to a great amount of trouble in relaying a buoy inside the harbour for "ROYAL OAK", I decided it was impossible for the ship to lie at it, there being insufficient water for swinging in. Although it was a great disappointment to the Spanish that we could not come inside, when Port Authorities saw the size of the ship they were in full agreement....
>
> 19.- Should any future visit be contemplated it would be advisable for a cruiser to go to Santander instead of a battleship. The anchorage in Sardinero Bay is fully exposed to any northerly winds and the slightest breeze sets up a big swell, making boat work hazardous.[72]

Still, there remained a qualitative difference, intangible to be sure, when such a task was executed by a capital ship. It would be going too far to avow that the peacetime raison d'être of the capital ship was the size of its quarterdeck. However, considerations of space alone dictated that when a tour of some importance was being planned, the employment of a capital ship was the trump card of the Royal Navy. Assessing the effectiveness of the Royal Navy's capital ships in 'showing an unfriendly flag' is more intractable. Turkey was not over-awed by the presence of a reinforced Mediterranean Fleet, and, in the end, Britain secured her objectives only by conducting a series of limited naval strikes with a sizeable military presence ashore. Perhaps it is fitting to leave the last word with Beatty. A paramount reason for sending Hood and

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[72]ADM 1/8735/75, Commanding Officer Royal Oak letter of proceedings No.43/1213 to Commander-in-Chief, Portsmouth dated September 1929.

Tiger and their associated escorts to Sweden and Denmark in the summer of 1920 was to support a possible demonstration against Russia. An event, in the end, that failed to materialise. Writing to his wife, he commented:

> We have now presented Soviet Russia with an ultimatum...We have now no men and no money. We have ships, but what can they do against a Power that is without Sea Forces. Blockade, yes, but that amounts to nothing. We can send ships, big ships, into the Baltic to obtain moral effect - but will that accomplish anything?[73]

Surveillance. Whilst forming a part of their operational continuum, Arnott and Gaffney do not define surveillance as a naval mission. Still, this writer accepts that surveillance exists as a distinct naval mission and proffers the following definition to facilitate an operational analysis of the capital ship. To wit, surveillance will be viewed as 'the act of deploying naval force to monitor an ongoing military or naval operation of another power without prejudice to the outcome of the operation, or the use of naval force to enforce a recognised international sanction such as the suppression of piracy, the slave trade, or the implementation of an embargo or blockade.' As surveillance does not seek to influence the course of action being followed by another power it falls below deterrence. Yet, as it requires the deployment of force, or the augmentation of an existing force, surveillance is beyond the realm of a routine mission of naval presence.[74]

During the interwar period, the Royal Navy conducted

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[73]Ranft, ed., Beatty Papers, Volume II, p. 97.

[74]Surveillance to be effective must, at times, be hidden or disguised. With this aspect of covertness, surveillance can in some respects be viewed as the antithesis of naval presence and deterrence. The Israeli attack on the USS Liberty in 1967 and the North Korean capture of the USS Pueblo in 1968 remain perhaps the quintessential examples of the task of naval surveillance at work.

missions of surveillance in its Home waters, the waters covered by the Mediterranean Fleet, and on the distant stations. An example of a surveillance operation in Home waters was provided by Hood on 4 August 1920 when she intercepted a convoy of surrendering German warships off the Scottish coast. Operation 'D.Y.' placed boarding parties from Hood on the German ships to determine, inter alia, the presence of submarine motors and wireless equipment, but the searches conducted revealed the presence of no contraband.[75]

Surveillance was a primary naval task on the China Station during the interwar era where its initial focus was the suppression of piracy along the coastal waters and inland waterways. Given the distances involved and the restricted nature of the waters, the light forces assigned, to include an aircraft carrier, were the ideal vessels suited for this naval task. Thus, when pirates seized the British merchant vessel SS Shuntien as it was steaming between Taku and Cheefoo on 17 June 1933:

> Action was taken immediately by the Commander-in-Chief at Weihaiwei. H.M.S. Eagle and Destroyers were ordered to the vicinity and a reconnaissance by aircraft was carried out over the estuary of the Yellow River. The pirates gave away their position by opening fire on the reconnaissance aircraft from junks in a creek. This fire was returned with effect. Live bombs were dropped near the junks accompanied by threats in writing to bomb the junks themselves.[76]

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[75]ADM 1/8590/106, Report of Proceedings letter No.27/12. dated 6 August 1920 from Captain Wilfred Tomkinson and Alan Coles, Invergordon Scapegoat: The Betrayal of Admiral Tomkinson (Stroud: Alan Sutton, 1993), p. 102. Coles' records the interception as taking place on 5 August but Tomkinson's report cited above shows that it happened on 4 August 1920.

[76]p. 18, 'A Brief Historical Summary of Affairs connected with the China Station' dated June 1937. Captain R. C. Bayne Papers, Imperial War Museum, London, IWM/91/29/1.

In time, the emphasis of the Royal Navy's surveillance duties became the monitoring of military and naval operations of Japan as that state expanded its penetration in the region. As the situation continued to deteriorate throughout the period, these surveillance operations grew in importance. In the Far East, the very basis of British imperial defence policy was predicated on receiving ample warning of any threat beyond the resources of local forces. The policy of 'Main Fleet to Singapore' left much to chance and ran considerable risks. The China and East Indies Stations were not sized to provide even a minimum level of deterrence, but were composed for purposes of presence, surveillance, and providing support to the local authorities.

In the main, the general absence of capital ships from Asian and Pacific waters did not hinder the conduct of surveillance operations against Japan. The Royal Navy's surveillance of Japanese operations in China had allowed a highly detailed assessment to be developed regarding that country's military and naval strengths and weaknesses. The rapid rise in the manning of the Imperial Japanese Navy from nearly 90,000 in 1932 to 112,000 by 1935 was noted by Rear Admiral Gerald Dickens[77] in a lecture at the Royal Naval War College.[78] In addition, the tremendous strides the Japanese Navy were making, and expected to make, in developing their naval air arm, the ongoing modernisation of her capital ships, and the scale of fleet manouevres were appreciated, particularly when contrasted with the

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[77]Later Admiral Sir Gerald Charles Dickens (1879-1962); Captain (1919); Commanding Officer, Carlisle (1922-1924) on China Station; Commanding Officer, Repulse (1929-1931); Director of Naval Intelligence (1932-1935); Vice-Admiral (1936).

[78]Lecture titled 'Japan and Sea Power' by Director of Naval Intelligence, Captain Gerald Dickens to Royal Naval War College, Greenwich on 15 May 1935, Dickens Papers, LHCMA.

current state of affairs in the Royal Navy.[79] Commenting on the operations of the Japanese Third Fleet in Chinese waters, the Commanding Officer of the cruiser HMS Danae, reported:

> They are prodigal in the use of ammunition and they appear to lack fire discipline; war is even more to them a matter of firing the guns than of directing them. Equipment in the 3rd Fleet is not of a high order. They appear to rely upon barrage fire with fixed fuse setting for their protection against aircraft. Their aircraft are poorly constructed and are not well handled: they never operate with more than three or at most four aeroplanes in company. When large numbers are used flight follows flight. Their bombing is inaccurate particularly the high bombing. Their ground work is exceptionally good both on aerodromes and on carriers. Six bombers landed on a carrier in 7 Minutes. 10 Secs. In fact everywhere where practice is possible they can become all but word perfect.[80]

Therefore, in terms of carrying out a mission of surveillance, the lack of capital ships in Asian and Pacific waters did not prevent a general picture of Japanese capabilities from being formed. An unwritten understanding of mutual and equal surveillance existed between the two navies. While the two powers were allies the sharing of information was made easier by the existence of a political understanding. Thus, the Commander-in-Chief, China Station reported:

> With reference to Admiralty telegram No.820 the Japanese Admiralty, having invited two officers to accompany the Naval Attache (sic) to witness the battle practice of three Japanese Battleships and two Battle Cruisers on the 29th, 30th and 31st July, I detailed Commander Frederick Bennett of my

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[79]Ibid.

[80]Report titled 'China, 1937' dated 20 November 1937 by Commanding Officer, Danae, Captain L. E. H. Maund, in Commander Sidney John Armstrong Papers, Liddell Hart Centre for Military Archives, King's College, London.

> Flagship and Lieutenant Commander C. E. Currey of "TITANIA" for this duty. They had not yet returned. Invitations have been sent for two Japanese Officers to come to Wei-hai-Wei on the 9th and 10th September to witness firing of British ships.[81]

Of the practice itself, the Japanese Navy made a favourable impression, and an internal assessment concluded in part:

> On the whole, it may be said that the *matériel* of the Japanese is inferior to that in British ships, but their zeal and application make good use of such as they have, and their salvo firing is very good.
>
> The annual battle practices are carried out on very realistic lines and are witnessed by a large number of officials...The target used consisted of one black sail, 120 ft. by 30 ft., with a 60 ft. mast in the centre. This target was attached by spans six fathoms in length to a rear target 90 ft. by 30 ft., so that the pair represented a length of 250 ft. in all, towed on a 5-in. wire at a speed of 12 knots...The firing ship's speed was about 21 knots. The *Haruna* fired 12 salvos from 14-in. guns and had six straddles, which was considered very good by the Japanese officers. The *Hiyei* fired eight salvos from 14-in. guns and had one straddle, having apparently lost time. The range was 17,000 to 19,000 yards, firing lasted 7½ minutes, and six rounds a gun was the allowance. *Hiyei* fired 96 rounds in five minutes in 13 salvos from her eight guns in the secondary armament, which was considered very good. The discipline at drill was excellent and the guns appeared easy to handle, but misfires occurred none the less, all firing being by electric tube.[82]

The reciprocity went beyond simply the inspection of each other's capital ships and touched almost every strand of

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[81]ADM 1/8581/24, Commander-in-Chief, China Station Letter of Proceedings, No. 562/661C.140 dated 4 August 1920.

[82]ADM 223/808, 'Confidential Admiralty Monthly Intelligence Report,' No. 20, dated December 1920, pp. 20-21.

the bilateral naval relationship. When Renown visited Japan in 1922, one officer who would have a chance to refine his views on the Imperial Japanese Navy observed that:

> I took the Captain of the "Ise" round the ship for about half an hour. I had dined next to him at dinner the night before. He seemed a very nice little man & did not appear to be trying to spy. We were told that the Jap sailors are being taught to keep their eyes open . & pick up what they can for as soon as they return from visiting one of our ships they are all made to sit down & write an account of what they saw. Being extremely slow in the up take I doubt if they learn much.[83]

Still, Renown's visit afforded the Royal Navy the opportunity to examine the Japanese Navy at firsthand and when the battle cruiser anchored at Yokohama, an inspection of the naval base was possible. A tour by four officers included an inspection of the Gunnery School, the Dockyard, and the latest Japanese battleship--the Mutsu. Their subsequent report was reproduced in a 'Confidential Admiralty Monthly Intelligence Report' and concluded with:

> In considering all we had seen one could not fail to be astonished at the standard of efficiency and smartness that had already been reached, both as regards material and personnel, in the Japanese Navy, a Navy which, when viewed in comparison with those of Western nations, is, after all, only in its infancy. They have evidently appreciated the necessity of strict discipline and hard work as a basis of efficiency, and herein, coupled with an amazing quality of perception and adaption, appears in some measure to be the secret of their remarkable success and progress.[84]

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[83]Tennant letter dated 26 April 1922, Tennant Papers, NMM/TEN/6. Tennant would later serve as the last commanding officer of Renown's sister ship Repulse.

[84]'**A DAY AT THE NAVAL STATION, YOKOSUKA, JAPAN.**' in 'Confidential Admiralty Monthly Intelligence Report,' No. 37, 15 May 1922, p. 38, Richmond Papers, NMM/RIC/4/1; original emphasis.

The process of reciprocal visits became strained when the British felt that they were not being accorded similar levels of access to Japanese ships and facilities as they afforded their former ally. There was very much a cat-and-mouse element in the way the two navies viewed each other, but by 1936 the one-sidedness of the relationship prompted a returning naval attaché to recommend that visits by his Japanese counterpart to British naval facilities should be restricted.[85] Of course for the Royal Navy, the real problem was never one of simply determining Japanese capabilities or in divining Japanese intentions--those issues had largely been resolved. Rather, the issue was to muster sufficient force should a mission of deterrence prove necessary in the time available.

If China represented the theatre where surveillance was the most regular ongoing naval task, then Spain was the scene that saw its furthest development, including the frequent use of capital ships. Certainly, the Service's response to the Spanish Civil War formed but one strand of the crisis, and its operational employment was very much coloured by the internationalisation of the war. Given the importance of the Straits for maintaining imperial communications and its possession of Gibraltar, Britain and her navy could not be disinterested in the events unfolding in Spain and Spanish Morocco in July, 1936, notwithstanding the attitude of Germany, Italy, France, and the Soviet Union. The Spanish Civil War provides an excellent operational venue to gauge the capital ship controversy. Coming as the war did so soon after the Abyssinian Crisis, the surveillance operations conducted strained the Navy and as Chatfield recorded:

> No sooner was the Abyssinian crisis over than a new one arose which was also seriously to affect the Navy. The Spanish

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[85]Best, 'Constructing an Image,' Intelligence and National Security, Volume 11, Number 3, July 1996, pp. 412-413.

> Civil War summoned the Navy in July, 1936, from Alexandria to Barcelona. For two years it was to keep watch and ward on the Spanish coast from the Bay of Biscay to Marseilles...[86]

In the event, the immediate issue facing the Navy was to protect British lives and property; reinforcement and rescue were the most pressing tasks. Only gradually did the mission expand to become one of surveillance. To this end, the Senior Naval Officer, Gibraltar requested that warships be sent to Spanish waters; a measure quickly adopted such that by 24 July 1936 thirteen vessels were operating in the immediate area.[87] One of the first units deployed and instantly involved in the reinforcement and rescue operations was Repulse. It departed Alexandria, Egypt for Gibraltar ferrying a battalion of infantry from the Gordon Highlanders; she then proceeded to Palma, Majorca and evacuated over 500 refugees on 30 July 1936.[88] This operation took place against the backdrop of a series of air raids that had been occurring during the course of the week. Embarkation began at 1000 hours and was completed at 1700 hours, at which time:

> the ship sailed for Marseilles. Just before weighing anchor Palma was subjected to the worst air raid she had yet experienced as though to emphasize the security of the battle cruiser.[89]

In the parlance of today, Repulse conducted a classic non-combatant evacuation operation; it would not be the last. By July, 1937, in excess of 27,000 refugees had been

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[86]Chatfield, It Might Happen Again, p. 92.

[87]Jill Edwards, The British Government and the Spanish Civil War, 1936-1939 (London: Macmillan Press Ltd., 1979), p. 105

[88]Patrick Beesly, Very Special Admiral: The Life of Admiral J. H. Godfrey, CB (London: Hamish Hamilton, 1980), pp. 85-86.

[89]From undated report titled 'The Mediterranean Fleet in Spanish Waters,' Chatfield Papers, NMM/CHT/3/1.

rescued by the Royal Navy.[90]

Notwithstanding the support in securing the safety of non-combatants, the Royal Navy's tasks during the Spanish Civil War gradually evolved into a lengthy surveillance operation aimed at limiting the importation of arms and ensuring the unhindered movement of normal commerce. First conducted under the sponsorship of the Non-Intervention Committee, they were later performed in accordance with the Nyon Agreement. From the beginning, an important consideration in mounting the surveillance operation was to be in a position to measure and limit Italian involvement. Accordingly, the Chiefs of Staff recommended inter alia that:

> We should maintain sufficient naval forces on the Western Mediterranean and Spanish Atlantic coasts to ensure that we have at least one ship at every port where the Italians have one, and that at important ports the British SNO is, if possible, senior to the Italian...[91]

The scale of these operations demanded the commitment of considerable resources including the capital ships, maritime patrol aircraft, and upwards of thirty destroyers.[92] At risk from air, surface, and subsurface threats, the dangers these naval forces faced operating off the Spanish coasts were very real. On 2 February 1937, Royal Oak was cruising off Europa Point near Gibraltar when:

> Three greyish low-winged three engine monoplanes flying 7000 feet considered possibly SAVOIA S 81, red wing tips, yellow and red horizontal stripes on rudder, two red bands athwart each wing and one round fuselage flew in formation over ROYAL OAK in position 36 degrees 10 minutes North 04 degrees 45 minutes West and dropped three

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[90]Edwards, British Government and the Spanish Civil War, p. 105.

[91]Ibid., p. 37. SNO refers to Senior Naval Officer.

[92]Schofield, British Sea Power, p. 143.

> small bombs in pattern, two of which exploded at 1135 Tuesday 2nd Feb. Nearest bomb fell three cables on starboard bow of Royal Oak.[93]

The Spanish Air Force attack missed, but Royal Oak was to be at the center of another incident later in the month when operating near Valencia. During an air raid on that city, an anti-aircraft shell hit the ship's quarterdeck slightly wounding a number of the crew.[94] An incident repeated in March, 1938 whilst operating near Majorca when Rear Admiral, Second Battle Squadron signalled:

> There was a small air raid on Palma at 1440 today Tuesday, apparent objective insurgent cruisers. Three or four bombs dropped in the sea about six caples (sic) from "CANARIAS" and the same distance from "ROYAL OAK" One two-pounder shell hit "A" turret barbette in "ROYAL OAK" without exploding. No casualties or material damage.[95]

Still, one naval officer reflecting on the recent attacks against the German pocket battleship Deutschland and the Republican battleship Jaime Primero[96] believed that naval surface forces had weathered the dangers well and commented that:

> we appear to have over-estimated the potentialities of air striking forces, and the earlier views--born of experience in the late war--that reconnaissance is the most effective role for naval aircraft seems to be re-established. If this is so, we ought to adjust the "casualty rules" used in our exercises, until they conform to current

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[93]Rear Admiral, Second Battle Squadron signal to Admiralty et al. dated 2 February 1937, Peachey Papers, NMM/PCY/3.

[94]Ibid., dated 23 February 1937.

[95]Rear Admiral, Second Battle Squadron signal to Admiralty dated 1 March 1938, Peachey Papers, NMM/PCY/3.

[96]Completed 1914, displacing 16,140 tons, and armed with eight 12-inch guns; sunk after an internal explosion in June 1937.

results.[97]

A view endorsed much after the event by Chatfield when he recorded that:

> The Spanish War had one interesting effect. It warned the uniformed, that the extreme views of those who claimed that the days of navies was past, were premature. The small nationalist navy dominated the waters of Spain though within easy reach of modern aircraft. That there was difficulty, in hitting ships with bombs dropped from heavy bombers travelling at high speed, was shown...[98]

Indeed, even one of the severest of critics during the interwar period of the capital ship had to admit that the actual experience of war had shown that the threat from the air had yet to materialise. Thus, Russell Grenfell noted that:

> There have been a certain number of incidents in recent years in which aircraft and men-o-war have come into hostile contact. There was the Greek naval rebellion of 1935, when aircraft were sent out to bomb the rebel cruiser Averoff. There was the Dutch naval revolt in the Far East a couple of years earlier, when they were similarly sent to deal with a mutinous battleship. And there has been the evidence of the Spanish war. In all these cases, the achievements of the aircraft have been poor and a long way below what the air enthusiasts claimed would be the case.[99]

An officer who attempted one of the most analytical evaluations of the air threat from the Spanish Civil War was Captain William Tennant.[100] In 1938, whilst serving as an instructor at the Imperial Defence College, he directed

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[97]Alpha, 'Recent Naval War Experience,' Naval Review, Volume XXV, 1937, p. 647.

[98]Chatfield, It Might Happen Again, p. 94.

[99]Grenfell, Sea Power in the Next War, pp. 68-69.

[100]Later Admiral Sir William George Tennant (1890-1963); Commanding Officer, Repulse (1941); Rear Admiral (1942); Vice Admiral (1945); Admiral (1948); retired (1949).

an exercise that examined, in part, the role of airpower in the Spanish Civil War. He concluded with:

> In my opinion, if a fleet is subject to the combined attack of the metropolitan air force of a country and if such an attack can be synchronised and if the A.A. fire has not improved on its present state today I believe such attack will be very serious.
>
> But, and I consider this a big but such synchronisation will be rare in war. Air Forces will have many calls on them....[101]

Tennant supported his argument by noting that of the thirty-four attacks made on warships in harbour, only eleven vessels had been damaged.[102] Whilst of forty-six ships that were attacked when underway, only six had received hits; in any event, no vessel had to date, been sunk by air attack.[103]

Support to Civil Authorities Involving Capital Ships. On more than one occasion during the 1919-1939 period the Royal Navy provided support to civil authorities in dealing with industrial labour disputes, and planning for scheme 'U.C.' dated from at least October 1920.[104] Furthermore, at least one Atlantic Fleet exercise of the period, 'M.M.,' conducted in October 1929, was played out against a presumed civil war occurring in Scotland.[105] (Perhaps not such a farfetched evolution, when it is recalled that the Navy and the Royal Marines had been actively involved in counter-guerilla operations arising from the civil war in

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[101]'Summary of Exercise 7,' Tennant Papers, NMM/TEN/42/4. Original emphasis.

[102]Ibid.

[103]Ibid.

[104]ADM 1/8593/139, Military Branch un-numbered minute dated 2 November 1920.

[105]Journal entry dated 25 October 1929, Beaufoy-Brown Papers, LHCMA.

Ireland between 1920-1922.[106]) Thus, it is perhaps with some irony that the capital ships of the Atlantic Fleet had a role to play in the former though not in the latter.[107] In an industrial dispute in Scotland in 1921, substantial naval forces were deployed to support local police efforts. Amongst the forces deployed was Nore Battalion D located at East Fortune, under the command of Captain M. L. Goldsmith. Composed of four companies of 1,100 ratings, they were taken, in part, from the battleship Erin, Royal Oak Depot, and from Repulse.[108] A second unit of similar strength, drawn in part from Repulse and Royal Oak, Nore Battalion A under Captain A. D. P. R. Pound, was held at Sheerness.[109] Meanwhile, Hood deployed a naval landing party of sailors and Marines to protect railway operations from striking coal miners.[110] When it appeared that a secondary strike by bus drivers of the Scottish Motor Transport was likely to occur in sympathy, Hood's midshipmen were seconded as drivers.[111]

Five years later, another coal strike began on 1 May 1926 and turned into a General Strike by 4 May 1926. This promised to be a more difficult matter, and, again, the

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[106]As the loyalty of the workers handling the Royal Mail was open to question, special channels for handling U.C. related communications between the Admiralty, the Atlantic Fleet, and the several naval commands were established. See ADM 1/8593/139.

[107]Malaya visited Queenstown briefly in 1922 and readied a naval landing party. In the event, no landing was required; see ADM 1/8632/173. ADM 1/8652/253 discusses the specific support provided by the Royal Navy in Irish waters.

[108]ADM 1/8604/71, Confidential Office Acquaint M. 0627/21 dated 5 May 1921.

[109]Ibid.

[110]Journal entry dated 14-16 April 1921, Elkins Papers, NMM/ELK/1.

[111]Alan Coles and Ted Briggs, Flagship Hood: The Fate of Britain's Mightiest Warship (London: Robert Hale, 1985), p. 19.

Government took steps to mitigate the strike's effect. The Atlantic Fleet deployed from its Home Ports on 3 May 1926 to perform its 'U.C.' duties.[112] Stokers from Ramillies, with an escort of Marines, were transported to Holyhead, Wales to assume control of a power station whilst another contingent of Marines were ferried to Manchester from Ramillies to guard the city's oil tanks.[113]

Certainly, however, where support to civil authorities was most prominent was in the colonies of the Empire or areas where Britain retained substantial influence. When unrest broke out in the autumn of 1921, Centurion was ordered to Egyptian waters to render assistance. The battleship's crew was used to man six commandeered small craft which formed the Nile Flotilla and of the event, one participant wrote:

> We have been ordered up here to man some river steamers on the Nile which may be an interesting show....I am going some 250 miles up the Nile to Kenha. There are 6 boats all together with 9 sailors in each & 5 machine guns. I don't know how long we shall be up the Nile but it will be a great experience. It is many years since the White Ensign has been seen on the Nile. The object of our show is to evacuate any Britishers in Upper Egypt should it be necessary. A considerable amount of rioting has occurred here such as the breaking of shop windows and chopping down of trees by the road side all of a very childish nature.[114]

Centurion's contribution was deemed decisive and included in addition to Lieutenant Commander Trevor, six other

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[112]Diary entry dated 3 May 1926, Oliver Papers, NMM/OLV/15.

[113]Journal entries dated 5-12 May 1926, Waldron Papers, IWM/86/59/1.

[114]Lieutenant Commander Ronald Trevor letter to his parents dated 24 December 1921, Commander Ronald A. Trevor Papers, Imperial War Museum, London, IWM/66/35/1. Kenha is at times also referred to as Qena.

officers, seven midshipmen, a gunner, and fifty-two petty officers and ratings.[115] The disturbances soon ended and,

> The moral effect caused by the appearance of the White Ensign in the waters of the Nile was evidently of much value and exercised considerable influence in cooling the ardour of the extremists.
>
> Lord Allenby, in paying a warm tribute to the aid rendered by the Navy, remarks that, "It made just the difference between safety and chaos".[116]

One may question whether the populace even recognised the White Ensign for what it was, but of the salutary effects of the Nile Flotilla's gunboats Trevor's official report noted:

> Mr Boys, an Englishman in charge of a cotton spinning factory came down to the bank to meet us....Mr Boys amused us very much at lunch by saying that the first intimation he received of our arrival was from a Greek who rushed into his office and told him that "Two dreadnoughts had arrived".[117]

It is difficult to make an accurate assessment on how vital, or even necessary, was the contribution of the Atlantic Fleet's capital ships, or more appropriately, their ships' companies, in supporting the civil authorities of the Home Government during the period's labour disputes. For a start, it was not just capital ships that provided naval landing parties in 'U.C.' operations; personnel were also drafted from lesser warships.[118] Balanced against the fact that such sizeable forces could be quickly mustered and deployed, they clearly upset the routine of the fleet. The paying off of the older 12-inch gun battleships St.

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[115]ADM 1/8617/229, Enclosure No. 5, Mediterranean Fleet letter No. 3338/6250/20 of 8 December 1921.

[116]ADM 1/8617/229, Director of Operations minute dated 4 February 1922.

[117]ADM 1/8617/229, 'Narrative of H.M. Tunnel Tug No 2.'

[118]ADM 1/8604/71, Confidential Office Acquaint M. 0627/21 dated 5 May 1921.

Vincent, Neptune, and Hercules was delayed because such support was lent.[119]

Turning to the support provided to colonial administrations, the contribution of capital ships is much easier to measure. It is difficult to conceive under what circumstances a British capital ship would have turned even its secondary armament on a domestic disturbance, but such a course of action was always a real possibility on a colonial station. When after recent disturbances, New Zealand, for the benefit of visiting island chiefs, fired a 12-inch three-quarter charge off Samoa in October 1919, a not so subtle message was being conveyed.[120] A point no doubt in the mind of the Commander-in-Chief, North America and West Indies Station when he reported to the Admiralty that he was retaining the battleship HMS Temeraire,[121] recently converted to a cadet training ship, at Port-of-Spain, Trinidad 'to discourage any tendency to unrest ashore' following labour unrest in that colony.[122]

Still, whilst the presence of a capital ship may have made responding to a labour dispute or civil unrest that much easier for the local authorities, such employment must be viewed as a luxury of chance. At a planning conference held prior to the dispatch of the Nile Flotilla previously discussed, Centurion's presence was deemed vital to meet the manning requirements of the flotilla and to support the defence of the Suez Canal. Thus,

> It has been pointed out to the G.O.C.[123]

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[119]ADM 1/8599/18, Commander-in-Chief, Rosyth signal to Admiralty dated 28 June 1921.

[120]Diary entry dated 15 Oct 1919, Hammill Papers, IWM 92/18/1.

[121]Commissioned 1909, armed with ten 12-inch guns, and of 22,300 tons displacement.

[122]ADM 1/8579/13, Commander-in-Chief, North America and West Indies Station Letter of Proceedings, No.64/S.9 dated 21 December 1919.

[123]General Officer Commanding.

> that if a light cruiser relieves "Centurion", it is very improbable that she would be able to meet these requirements even with 2 destroyers.[124]

Centurion was held on station until the crisis had been defused and was then relieved by the cruiser Ceres on 21 January 1922; the Nile Flotilla itself having been disbanded on 18 January 1922.[125] One may contrast these events with the contemporaneous disturbances occurring in Hong Kong. When in February, 1922 Chinese seamen went out on strike, not only did the episode take on racial overtones, but the dispute raised serious security implications arising from the need to maintain food imports in the colony. The Navy was called upon to provide a wide range of support including operation of the customs service, manning the harbour tugs, and overseeing the transhipment of food.[126] Disruptive as the affair was, the China Fleet and its flagship, the cruiser Hawkins, managed it all without the presence of a capital ship.

On balance, in an era when specialised amphibious warships had yet to make their appearance, the capital ship represented the period's closest equivalent. Notwithstanding, Richmond's theoretical arguments over what dictated the maximum size of a naval vessel, the practical experience of the Service when conducting naval operations in support of civil authorities was that a larger vessel was inherently more useful. Repulse's early intervention in Spain, cited earlier, is testimony of that point. Proof yet again was the intervention of the Royal Navy in Palestine in August and September 1929. The cruiser HMS

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[124]ADM 1/8617/229, Senior Naval Officer, Egypt to Commander-in-Chief, Mediterranean letter No.54/E/65/E dated 15 December 1921.

[125]ADM 1/8617/229, Director of Operations minute dated 1 February 1922.

[126]'The Hong Kong Strike, February, 1922.' in 'Confidential Admiralty Monthly Intelligence Report, No. 37, 15 May 1922, Richmond Papers, NMM/RIC/4/1.

Sussex fielded a naval landing party composed of 20 officers and 297 ratings, whilst Barham was able to land 27 officers and 403 men.[127] Yet, the balance was shifting. Courageous during the same intervention embarked a battalion at Malta of the South Staffordshire Regiment along with 32 of its limbered wagons, and proceeded to sea where:

> it was possible to "fly on" nineteen aircraft of three different types in the course of one and a half hours, and also, before troops were landed, to fly off six machines urgently required on arrival at Jaffa.[128]

Deterrence and Limited Naval Strikes. During the 1919-1939 period, the Royal Navy conducted missions of deterrence as an outgrowth of its surveillance operations during the Spanish Civil War, to protect its interests in China, and to forestall Italian offensive operations against Egypt at the time of the Abyssinian Crisis. The use of heavy ships at the time of the Spanish Civil War was recommended by Vice Admiral Sir Geoffrey Blake[129] as a means to deter insurgent attacks against British merchant and naval shipping.[130] Cable notes that the use of superior ships was a conscious choice by the British and was in response to prior incidents where British light forces had faced the Nationalist cruiser Almirante Cervera and had been forced to yield to what was in effect force majeure.[131]

Beyond a host of minor operations that frequently subsided as quickly as they arose, the Royal Navy on two

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[127]Charles W. Gwynn, Imperial Policing (London: Macmillan and Company, Ltd., 1934), p.

[128]Ibid., p. 243.

[129]Later Admiral Sir Geoffrey Blake (1882-1968). Fourth Sea Lord (1932-1935); retired (1938).

[130]James Cable, Gunboat Diplomacy: Political Applications of Limited Naval Force (London: Chatto & Windus, 1971), pp. 101-102.

[131]Ibid.

occasions found itself engaged in limited naval operations that showed every prospect of leading to a general war: Turkey from 1919-1923 and the Baltic Sea littoral from 1919-1920 with the Soviet Union.[132] Both areas found the Navy involved in substantial operations that were far removed from Jutland and the spectre of a fleet action. Yet, for that, capital ships were central to the Royal Navy's response to the former, and had the Baltic crisis continued, would have been at the fore in the latter. The Service's ongoing response to the instability found in the Eastern Mediterranean and the consequent need to retain heavy ships in the area has been commented on previously. The use of heavy ship support in these operations was of mixed effectiveness. The flexibility they afforded in moving substantial ground forces and in supporting evacuations and withdrawals was shown time and again, and their heavy artillery, on the surface, appeared to provide local superiority. Still, the use of heavy ships by themselves could not influence events on the ground over the long term, whilst the threat of naval gunfire sometimes proved of more value than the actual results obtained. Such must be the conclusion, if the experience of Ajax operating off Odessa in 1920 was at all representative. Haggard, her commanding officer, recalled that:

> Such was our gunnery inefficiency at that early period of the commission, it was with greatest difficulty the guns could be fired at all, but in the end we fired three rounds of 13.5" shell...I doubt whether they had any useful moral or material effect.[133]

Haggard deemed the state of Ajax's gunnery so deplorable that:

> I was asked to bombard the town but refused to do so as such firing would be

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[132]See Bullen, 'The Royal Navy and the Baltic 1918-20,' University of London, Unpublished Ph. D. Dissertation, 1983 for a recent assessment.

[133]'Narrative, Volume V,' Haggard Papers, IWM/85/21/2, p. 45.

> indiscriminate and dangerous to Whites and Reds alike. However, I agreed to fire anti-aircraft high explosive shell over the town to discourage the sharp shooters on the roofs.[134]

A Court of Enquiry was convened and Ajax's poor gunnery proficiency was attributed to the design of the mountings.[135]

For missions of deterrence and limited strikes capital ships proved useful, but not essential. The deduction must be that the one factor that contributed to their use was availability and not design. The China Station was the scene of constant instability, and the deployment of divisional level military forces from the United Kingdom in 1927 in defence of Shanghai was notable by its absence of supporting heavy ships. This is not to say that heavy ships were not desired by successive commanders-in-chief in response to the growing Japanese threat; they were, but with 40% of British naval manpower already serving overseas,[136] deployment of heavy ships to the Far East, in the absence of mobilisation, could only be done by withdrawing personnel from other stations to Home waters.[137] Moreover, it must be remarked that such was not the case when it came to the support provided by aircraft carriers. From the earliest days of the interwar period, their use was deemed essential in supporting any operation and their manning was protected accordingly. When planning for operations in the Baltic area the Admiralty advised that:

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[134]Ibid., p. 46

[135]Ibid., p. 62.

[136]ADM 1/9181, Director of Plans un-numbered minute dated 31 May 1937. The percentage of naval personnel serving abroad was:

1914	16.8%
1921	19.6%
1925	35.0%
1929	40.0%
1933	40.0%.

[137]Admiralty letter M.00509/33 to Commander-in-Chief, China dated 8 July 1933, Roskill Papers, ROSK/7/164.

> An aircraft ("Argus") should also be sent. The proximity of Biorko to the enemy base renders co-operation by aircraft, both for reconnaissance and defence, absolutely necessary, and the Air Ministry is being approached on this matter. It is considered that to send a force unaccompanied by aircraft would place it at a very serious disadvantage.[138]

A second conclusion that must be drawn is that finance was a strong determinant in the planning of any operation, and the Admiralty was sensitive to the cost any contingency would make against the Naval Estimates. Thus, when contemplating the use of heavy ships in the Baltic Sea against the Soviet Union, the Admiralty was instructed not to make any permanent increases to the fleet operating in the Baltic until the costs were understood and approved by the Cabinet.[139]

Ultimately, the deterrence practiced by the Royal Navy achieved limited results, but then British policy had for the most part limited objectives. The United Kingdom had no desire to square-off with Italy unilaterally over Abyssinia, could not mandate Dominion support over Chanak, and was not willing to pursue an independent line against Russia. Following the establishment of the League of Nations in 1924, Britain constrained its policy through a process of internationalisation. One could argue that where deterrence was most clearly defined as a naval mission, the Far East, the Service failed utterly in its execution, and that the most visible affirmation of this failure, the sinking of Force Z (the battleship Prince of Wales and the battle cruiser Repulse) demonstrated that when tested, the capital ship proved a poor agent of deterrence. The rejoinder is that having opted for war, it is debatable whether any measure of deterrence could have

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[138]ADM 1/8596/68, Admiralty letter M.01539 to Commander-in-Chief, Atlantic Fleet dated 11 May 1920.

[139]ADM 116/1775, First Lord memorandum to the Cabinet dated 20 May 1920.

forestalled Japanese actions by December 1941. Certainly, the Battle Divisions of the U.S. Pacific Fleet recently moved to Pearl Harbor, Hawaii proved inadequate to the task.[140]

Summary: The Operational Justification of the Capital Ship. On balance, when the arguments surrounding the capital ship controversy are broadened and encompass an examination of its operational role within the interwar Royal Navy, it can be seen that the case for its retention was very strong. Simply stated, no other warship operated by the Navy was blessed with such flexibility across the continuum of naval operations. Whether 'showing the flag' as an agent of naval presence, operating as a unit of surveillance, supporting civil authorities at Home or abroad, or acting as a visible deterrent the capital ship proved itself a capital asset. Nothing from the Service's operational experience (gained admittedly from a limited base) forced it to change its belief in the value of heavy ships in the face of air and underwater threats. On the contrary, the experience on offer confirmed that the capital ship was the type most able to operate in the face of such risks.

That said, its running costs were high, its size precluded it from operating in all areas, its effectiveness was at times limited by material defects, and manning was ever a problem. There is a qualitative difference between the economy of force and the force of economy. Haggard's evidence by itself is only anecdotal, but when viewed in conjunction with the material and procedural problems discussed previously, a reasonable conclusion drawn must be that the operational effectiveness of a capital ship was difficult to secure and equally difficult to maintain. How

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[140]In April 1940, major units of the United States Pacific Fleet were relocated to Hawaii from San Diego, California. See Louis Morton, The U.S. in World War II, The War in the Pacific, Strategy and Command: The First Two Years (Washington: Center of Military History, 1989), p. 102.

effective battleships and battle cruisers were as instruments of war at the tactical level will now be considered.

CHAPTER VI

THE DEVELOPMENT OF FLEET TACTICS AND THE ROLE OF THE CAPITAL SHIP DURING THE INTERWAR PERIOD

> While it is the business of the strategist and the organiser to bring a superior force against the enemy at the decisive point, it is the business of the tactician to fight with whatever force he is furnished.[1]
>
> Richmond

> The Tactical encounter is the culminating act in war and is therefore of supreme importance, for though bad strategy may be redeemed by successful tactics, there is no remedy for defeat in battle.[2]
>
> Dreyer

> Commanders of all squadrons must take full advantage of every incident of the action to press the enemy, always remembering that the destruction of the enemy, particularly his battlefleet, is the object that they must relentlessly pursue.[3]
>
> 'Battle Instructions,' 1931

Introduction. Ultimately, resolution of the capital ship controversy would be settled by its tactical performance. Strategy may point the way to which type of ships to be built and what sort of naval war to be waged, but success in naval battle would decide the merits of retaining heavy ships and their place in fleet doctrine. Tactically, the controversy revolved around the merits of

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[1]Richmond lecture 'Tactics,' Royal Naval War College, Greenwich, Spring Session 1920, Richmond Papers, NMM/RIC/10/2, p. 28.

[2]ADM 1/8658/69, Dreyer lecture 'Study of War & of the Conduct of Naval Operations,' delivered 23 June 1924, Royal Naval College, Greenwich.

[3]ADM 186/106, 'C.B. 01821, Battle Instructions,' p. 59.

the capital ship as a weapons' platform and the retention of the battlefleet as the core of the main fleet's striking arm. In the absence of war, tactical development and unit proficiency were difficult to ascertain. Whatever the yardstick employed to measure presumed tactical effectiveness there remained a margin of doubt as conditions to be expected on active service could not be determined or created with certainty. Moreover, training evolutions were scripted to meet requirements other than expected battle conditions. This allowed personnel to gain familiarity with equipment and concepts, and permitted the Service to game strategic scenarios in restricted waters. Thus, to compensate for the smaller training space available on the Mediterranean Station compared to the distances to be expected in any Far Eastern war, speed restrictions were applied to vessels.[4] Unfortunately, though the depth of air reconnaissance could be limited, speed restrictions could not be enforced upon aircraft, and this made any assessment of ship versus aircraft encounters difficult in the extreme.[5]

Regardless of the station or the fleet, the ships and men of the Royal Navy followed a pattern in their day-to-day operations that facilitated the training of individual ships and their crews, allowed ships of the same type to be worked up collectively to form an effective squadron or division, and then saw the union of squadrons and divisions, finally, work together as a fleet. For ships in Home waters and on the Mediterranean Station, the climax was reached during January to March of each year when the two major fleets usually operated together in the western Mediterranean and in the Atlantic waters near Gibraltar. This pattern was, at times, interrupted due to operational commitments--particularly, during the Abyssinian crisis and

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[4]ADM 186/149, 'C.B. 1769/31(1), Exercises & Operations, 1931, Volume I,' Admiralty, Naval Staff, Tactical Division dated April 1932, p. 21.

[5]ADM 186/145, 'C.B. 1769/29(1),' p. 44.

the Spanish Civil War.[6] Yet, even without such commitments, the pattern became increasingly more difficult to sustain as the period progressed, when states began to look askance at British warships operating in their territorial waters. Where, heretofore, Portugal, Spain, Turkey, and Italy had acquiesced in the periodic, but unannounced use of their territorial waters, objections to such practices became the norm.[7] In the end, only Greece, of the Mediterranean states, continued to offer such unfettered access, though even here, the employment of certain weapons had to be curtailed.[8]

The pattern was on a grander scale for ships in Home waters or on the Mediterranean Station, but a discernible pattern existed, nevertheless, for ships in Chinese waters or on the Atlantic and West Indies Station. Certainly, the weather dictated the pattern of employment to some extent, and the need to periodically visit key dominions, colonies, or trading partners also played a role. These operational requirements and quality of life concerns were juggled with the need to follow the strictures of King's Regulations and Admiralty Instructions regarding the periodic testing of engineering plants, the streaming of paravanes, and the necessity of ensuring gunnery and torpedo proficiency. If for the heavy ships of the Atlantic/Home and Mediterranean Fleets, the culmination of a year's hard work was the strategical exercises of the Spring Cruise where Red Fleet fought Blue Fleet, this summit was reached only after much

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[6]ADM 186/349, 'C.B. 3001/38, Progress in Naval Gunnery, 1938 Edition,' Admiralty, Naval Staff, Training and Staff Duties Division dated April 1938, p. 5.

[7]ADM 116/2285, Commander-in-Chief, Mediterranean letter No.2466/561/12 dated 14 December 1925.

[8]ADM 186/151, 'C.B. 1769/32(1), Exercises & Operations 1932, Volume I,' Admiralty, Naval Staff, Tactical Division dated January 1933, p. 2.

preliminary work had been completed.[9] In a very real sense, the striving for tactical competency was a never ending evolution. Ships were paid off, repaired, and recommissioned, while squadrons were rotated between Home waters and the distant stations. All the while, new weapons and ancillary equipments were added to the fleet, tested, and evaluated. Against this backdrop, the doctrine of the Service was modified and similarly tested during fleet exercises. Thus, the capital ship's role in the fleet was subjected to a process of continual validation through the exercise programme of the Service.

The Sources and Development of Tactical Doctrine in the Royal Navy. The core of fleet tactical doctrine was reflected in two instruments: the 'Manoeuvring Orders'[10] and the 'Battle Instructions.'[11] The first agent prescribed how a fleet positioned itself for battle; the second work specified how an engagement, once joined, was to be fought. The 'Manouevring Orders' and 'Battle Instructions' codified the tactical precepts to be followed during the three phases of battle: the approach, the action, and the pursuit.[12] The antecedents of these publications were the Grand Fleet's 'Fighting Instructions' and 'Manoeuvring Orders.' Operating in the context of peacetime, they frequently served as a point of departure in fleet

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[9]This pattern was broken from 1930-1933 when the heavy ships of the Atlantic/Home Fleet visited the West Indies, restricted their operations to the Atlantic waters of Spain and France, and conducted only limited exercises with the Mediterranean Fleet.

[10]Two series of orders, with amendments, during the period were issued: 'C.B. 1716, Manouevring Orders,' dated 20 November 1925, ADM 186/636 and 'C.B. 1822, Manouevring Orders,' dated 28 April 1936, ADM 186/637.

[11]Two editions, with amendments, of Battle Instructions were issued during the period: 'C.B. 01715, Battle Instructions,' dated 1 October 1925, ADM 186/72 and 'C.B. 01821, Battle Instructions,' dated 15 June 1930, ADM 186/106.

[12]Or, in the event of defeat, the retreat.

exercises to test alternate tactical methods. They were the bedrock of fleet tactical doctrine, and, if war arose, the combined Mediterranean and Atlantic/Home Fleets would operate in accordance with their precepts.[13] That said, the 'Battle Instructions' were not orders, but guiding principles that acted in conjunction with the 'Naval War Manual,' the 'Destroyer Attack Instructions,'[14] 'Torpedo Aircraft Attack Instructions,'[15] 'Naval Tactical Notes,'[16] the Tactical Manual,[17] the manuals developed for each class of warship, and would be supplemented by additional instructions on the outbreak of war based on the enemy naval power in question.[18] Finally, the 'Battle Instructions' were fundamentally the guidance required to fight a fleet action on the grandest scale, including the participation of any allies; they were not written to cover every conceivable naval action.[19]

The 'Manoeuvring Orders' and 'Battle Instructions' represented the received wisdom of the Service. As such, changes to them were evolutionary in nature, rather than revolutionary. Change, when warranted, came after experimentation, discussion, analysis, and compromise. During the period, the relevant divisions of the Naval Staff directed the fleets to investigate specific tactical problems relating to gunnery, torpedo work, air operations,

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[13]ADM 1/8700/121, Commander-in-Chief, Atlantic Fleet to First Sea Lord un-numbered letter dated 11 September 1925.

[14]'ADM 186/95, 'C.B. 01721, Destroyer Attack Instructions,' dated 1936. Renamed Destroyer Fighting Instructions in 1938.

[15]Later reissued as 'C.B. 01916, Aircraft Attack and Defence Instructions,' dated 1933, ADM 186/96.

[16]Extracts of 'C.B. 01847' can be found in ADM 1/9387.

[17]'C.B. 1601, Tactical Manual,' was issued in 1921. It is not on file at the PRO.

[18]ADM 186/106, 'C.B. 01821,' p. 3.

[19]Ibid.

and manoeuvre. Specific issues in these areas were defined for each type of warship and tested at the Tactical School and in unit, divisional, or fleet evolutions, as appropriate. The Naval Staff evaluated the results and either made a recommendation based on the findings or ordered additional tests, if matters appeared inconclusive. Appendix VII documents the specific gunnery problems investigated for capital ships during the 1919-1939 period. In turn, experimentation within the fleet resulted in changes to the 'Battle Instructions' and 'Manoeuvring Orders' as the Admiralty accepted the recommendations of subordinate commands. One example of such a change was the inclusion of 'Forms of Battle,' originally developed within the Mediterranean Fleet, in the 'Battle Instructions.'[20] These codified the tactics to be adopted for each class of ship against a particular enemy, and could be executed rapidly via signal based on the type of battle to be expected.[21]

Gunnery and Torpedo Fire. Tactical proficiency in gunnery and torpedo work in heavy ships was obtained by practical exercise and instructed course work covering both theory and demonstrated application. The latter principally being taught at HMS Vernon, and the former at Excellent, the gunnery development and training establishment, located at Whale Island. Inclination exercises, for training control personnel in target ranging and course changes, and necessary to guarantee the correct calibration of equipment, were an ever frequent occurrence in the training programme, whilst a ship's guns themselves were calibrated on a measured range such as found at

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[20]ADM 186/143, 'C.B. 1769/27(2), Selected Reports of Exercises, Operations and Torpedo Practices in H.M. Fleet, Summer and Autumn, 1927,' Admiralty, Naval Staff, Torpedo Division and Tactical Section dated September 1928, p. 6.

[21]ADM 186/106, 'C.B. 01821,' p. 61.

Shoeburyness, Essex.[22] In addition, attack simulators and spotting tables were used to train gunnery and torpedo personnel and air observers. These tables provided life-like views of ships as they came into view,[23] and Waldron while serving in Ramillies had occasion to observe their use:

> Went to the Gunnery School....A "spotting-table" was used. I have never seen one before.
>
> Three model ships were used, and splashes were represented by wooden labels--raised by pressing keys at the side. A special gearing allows range and deflection to be put on the table, and splashes are moved to the appropriate relative position.[24]

A somewhat similar arrangement was used to train aerial observers and consisted of a table,

> which moved scale model ships on a pseudo sea by remotely controlled electro-magnets, and simulated fall-of-shot by spots of light, where one could run through the whole gambit of an approach and fire-distribution sequence, and engagement, with...observers in moving trolleys pretending to be spotting aircraft.[25]

Moreover, by the 1920's training was enhanced by capturing the results of fleet exercises on film for future analysis.[26]

The aim of gunnery and torpedo practice was to foster the maximum degree of simultaneous concentration against an

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[22]ADM 186/88, 'C.B. 3026, Firing Manual, 1933,' Admiralty, Naval Staff, Training and Staff Duties Division dated April 1933, p. 48.

[23]'Narrative, Volume VI,' Haggard Papers, IWM/85/21/2, p. 21.

[24]Journal entry dated 24 September 1925, Waldron Papers, IWM/86/59/1.

[25]R. M. Ellis, 'When the rain's before the wind,' unpublished manuscript, Captain Robert Meyric Ellis Papers, Churchill Archives Centre, Cambridge, ELLS/3, p. 2.3.

[26]Journal entry 12 December 1924, Madden Papers, NMM/MDN/2.

enemy naval force by all available warships.[27] Such a concentration in gunfire also resulted in a higher rate of hitting than when ships fired independently.[28] The first practical steps in concentrating the fires of multiple ships against a single target had been pursued in February 1917 by the Fourth Battle Squadron, and, by that year's end, a pair-ship concentration was initiating fire at 24,000 yards.[29] It was at this juncture that the 'Spotting Rules' were introduced to control the fire of a heavy ship's main armament; in 1921, similar rules were developed for controlling the secondary armament.[30]

Gunnery practice was typically carried out with an eye to training control and turret personnel in their duties whilst minimising cost,[31] the fatigue placed on a ship's guns, and damage to ship superstructure.[32] Consequently,

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[27]ADM 186/66, 'C.B. 973,' p. 30.

[28]By 1927, it was calculated that the fire effect factor for two ships concentrating on a single target was roughly 2.5 times greater than for a single ship firing, whilst for a four-ship concentration, the fire effect factor was between 4.5 and 4.7 times greater than for a single ship. Though the supporting data was more tentative, a three-ship concentration had a fire effect factor 2.9 to 3.0 times greater than for a single ship firing independently. Based on the above, it would appear that the Navy would have been better served by limiting itself to pair-ship concentration. That it did not was probably attributable to the theoretical calculations of the n-square law effect which posited that a four-ship concentration was more effective. See ADM 186/289, 'C.B. 3001/27,' p. 51.

[29]ADM 186/238, 'C.B. 902, Progress in Naval Gunnery, 1914-1918,' Admiralty, Naval Staff, Gunnery and Torpedo Division dated July 1919, p. 31.

[30]ADM 186/339, 'C.B. 3001/1914-36,' p. 10.

[31]For Nelson, the cost of a broadside with service shell was £2,000.00 while with practice shell the cost was £800.00. See 'Notes on Technical Subjects,' Barnard Papers, IWM/P256, p. 2.

[32]V. E. Tarrant, Battleship Warspite (Annapolis: Naval Institute Press, 1990), p. 11.

firing a service shell with a full charge was a seminal event in the working up of the ship. More often practice of a more limited nature was the norm. Such a drill might use a 1.1-inch aiming rifle, be a sub-calibre shoot, where a 6-pdr. or 3-pdr. gun was inserted into the naval rifle to allow a smaller calibre shell to be fired with a reduced charge, or fire a service shell with a reduced charge.[33] The practice could include both main and secondary armament and exercise the differing types of fire control: Master Ship Control, Individual Ship Control, Main Armament Control, sector firing, director firing, gyro firing, firing by directing gun, gunlayers firing, divisional firing, firing by quarters, or independent control.[34]

The target in a gunnery shoot could be a consort in company with the firing ship, in which case the aim was directed off target by a standard variance, typically, of 6^0 or 12^0.[35] The object of the shoot might be a high speed coastal motor boat,[36] a Pattern VI target measuring $37\frac{1}{2}$' in length,[37] a battle practice target which measured 145' in length,[38] or from June 1923, onwards, a string of three battle practice targets towed by another vessel.[39] A measure developed further when, in 1925, the Second Battle

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[33]ADM 186/88, 'C.B. 3026,' pp. 17-18 and ADM 186/179, 'C.B. 1773(3), Armament List, April, 1938.'

[34]ADM 186/88, 'C.B. 3026,' pp. 17-62.

[35]Journal entry dated 1 October 1923, Lambert Papers, IWM/90/19/1 and journal entry dated 15 November 1922, King Papers, IWM/90/23/1.

[36]ADM 186/257, 'C.B. 947, Progress in Naval Gunnery, 1921,' Admiralty, Naval Staff, Gunnery Division dated March 1922, pp. 8-9.

[37]Journal, p. 31, Gotto Papers, IWM/83/55/1.

[38]Journal entry dated 3-4 March 1923, Elkins Papers, NMM/ELK/1. D. Arnold-Forster, The Ways of the Navy (London: Ward, Lock & Co., Limited, 1931), p. 126 gives the dimensions of a battle practice target as 200'.

[39]ADM 186/261, 'C.B. 971,' p. 50.

Squadron[40] and Hood were practising fire distribution against seven battle practice targets towed in line.[41] Finally, from 1921 onwards, the object of a fire plan could be a dedicated target ship, such as Agamemnon or Centurion, controlled remotely by wireless.[42] Elkins captured the essence of such a shoot:

> We weighed at 0800 to carry out a secondary armament concentration shoot on the "Agamemnon". The 5.5" were to be controlled by the 1" control....We used special soft nosed shells with no bursting charge.
>
> It was wonderful to see the way "Agamemnon" manoeuvred. To all outward appearances, she might have been steered by an experienced Quartermaster, doing his best to avoid the Salvos.
>
> She was hit time & time again by full salvos but no severe damage was done, although her upperworks and superstructure were riddled.[43]

Each type of practice had its advantages and disadvantages, and it was only by recourse to all that proficiency once secured was maintained.

At long range, the gunnery of the fleet would be concentrated on a portion of the enemy fleet (e.g., the van, centre, or rear), and, ideally, on the enemy's flagship.[44] If visibility or distance precluded such a fire distribution, then on that portion of the enemy fleet in range. To help foster such a fire distribution, smoke shell would be fired on a portion of the enemy battlefleet to hinder enemy ranging and engagement and to allow the British battlefleet to achieve a local superiority in fire

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[40]Revenge, Royal Oak, Ramillies, Royal Sovereign, and Resolution.

[41]ADM 186/270, 'C.B. 981,' p. 3.

[42]ADM 186/251, 'C.B. 1594,' p. 56.

[43]Journal entry dated 11 November 1921, Elkins Papers, NMM/ELK/1.

[44]ADM 186/106, 'C.B. 01821,' pp. 140-142.

distribution.[45] As the range diminished, the degree of fire concentration would be lessened as it was essential that all enemy ships of the opposing battlefleet were engaged.[46]

Still, notwithstanding the Service's understanding of the weapons it employed and the precepts to be examined, a limiting factor of the greatest sort forestalling tactical improvement was the manning policy of the fleet. Turnover in ships' companies hindered proficiency, and, in the Atlantic Fleet during the 1919-1922 period, the rotation of one rating in six every four months made it difficult to advance beyond basic gun drill.[47] This hindrance was addressed in 1923 when the afloat personnel of the Atlantic Fleet were changed en masse after a commission of two years.[48] Subsequently, the manning policy of the Home Fleet was changed yet again, and in 1939 the practice was to change a third of the complement during each of the three principal leave periods of the year; as a consequence, the first month of each cruise period was devoted to developing basic gunnery proficiency.[49] A further hindrance was that heavy ships were frequently operated with reduced complements, or with a complement of boys embarked for training purposes. An example of the last point is offered by Ramillies which served as a Boys' Training Ship in 1938 and carried a reduced communications staff. This reduced her effectiveness during the several serials associated with exercise 'Z.P.,' a combined fleet manoeuvre held in

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[45]ADM 1/8658/69, 'Tactics,' Royal Naval Staff College, Greenwich, Session 1922-1923.

[46]ADM 186/106, 'C.B. 01821,' pp. 40-42.

[47]ADM 186/258, 'C.B. 962,' p. 17.

[48]Ibid.

[49]Captain M. W. S. L. Searle lecture 'The Organisation of the Practices of a Fleet in Peace & War,' Royal Naval Staff College, Greenwich dated 1 July 1948, Roskill Papers, ROSK/7/163.

March 1938.[50] By this time, the expansion programme of the Service created manning problems of a different sort which hindered proficiency.[51] Writing to Pound, the Commander-in-Chief, Mediterranean, the First Sea Lord lamented:

> the training question gets more and more difficult. Crowds of boys are coming into the Navy and are ready to go to sea, with no ships to put them into because we have not got enough Artificers and cannot get them fast enough. I have refused to use any more Battleships for training purposes.[52]

As most exercises conducted were of a very short duration, the actual import of a ship's reduced complement was masked. When at last, fleet exercises were held over a sustained period, the shortfalls in manning were telling, and the two departments most affected were the communication's establishments in heavy ships and the corps of naval air observers.[53]

Finally, during the latter part of the period, it was difficult for a ship to work up to a high standard of proficiency, if it had just been reconstructed. Royal Oak is a case in point. Following its recommission after a two-year refit in August 1936, it spent time in Home waters serving as a mutinous ship of an unnamed South American navy during the filming of 'The Eternal Navy' in October 1936 before departing for duties in Spanish waters in January 1937. It returned to Home waters in June 1937, and proceeded to Liverpool where it participated in Coronation celebrations. This period of detached service made

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[50]ADM 186/159, 'C.B. 1769/38, Exercises and Operations, 1938,' Admiralty, Naval Staff, Tactical Division dated February 1939, p. 3.

[51]ADM 186/349, 'C.B. 3001/38,' p. 5.

[52]Chatfield letter to Pound dated 5 August 1937, Chatfield Papers, NMM/CHT/4/10.

[53]ADM 186/157, 'C.B. 1769/35(1) and (2),' p. 95.

squadron and fleet work impossible.[54]

That said, a curious phenomenon of the interwar period is that despite technical improvements in fire control systems and changes in manning policy, gunnery proficiency in heavy ships, as measured in hitting salvos per ship per minute, decreased for much of the period.[55] Several explanations for this occurrence avail themselves. First, the introduction of improved fire control tables and ranging equipment involved a learning curve, while experience was gained and new procedures were developed. As such, gunnery efficiency trailed off until the new means were perfected. Secondly, the actual number of practices conducted was hamstrung by fiscal policy, and as the surplus of ammunition left over from the 1914-1918 war was expended, it was not replaced on a one-for-one basis.[56] Thirdly, the tactical evolutions that the Service attempted were of an order of magnitude more complex than hitherto had been the case. Thus, the scope for things to go amiss increased as attempts at replicating battle conditions were pursued. This moved the Commander-in-Chief, Mediterranean to observe:

> "Realism in peace practices is always to be aimed at, but in view of the necessarily limited amount of full calibre ammunition allowed for practice, there is a danger that the effort to attain realism may result in frustrating their main object, namely, to afford practice in hitting an

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[54]ADM 186/551, 'C.B. 3002/38, Progress in Torpedo, Mining, Minesweeping, A/S Measures, and Chemical Warfare Defence, 1938 Edition,' Admiralty, Naval Staff, Tactical Division dated June 1938, p. 15.

[55]The figures for MSC firing based on hitting salvos per ship per minute were:

1921	.451	ADM 1/8658/69
1924	.62	ADM 186/263.
1926	.57	ADM 186/271.

In 1927, the criteria of measurement was changed to average straddling salvos per ship per minute:

1927	.54	ADM 186/289.

[56]ADM 186/298, 'C.B. 3001/29,' p. 5.

enemy.

"Drastic casualties to personnel and breakdowns in material, while excellent as tests of the fighting organisation, may produce such dislocation in the control as to cause waste of valuable ammunition. Until more full calibre ammunition is available for practice, it will remain necessary to seize every opportunity to practice breakdowns during harbour drills and sub-calibre practices so as to leave full calibre practices free...[57]

The above views were endorsed by the Commander-in-Chief, Atlantic Fleet, and followed an order issued in 1926 that restricted key personnel from the wearing of chemical defence clothing and equipment during shoots, as the effects on gunnery proficiency had become so pronounced.[58] This difficulty was captured by one midshipman who noted:

> During the forenoon we exercised action stations. I again tried my hand at the Master Dumaresq, but found I got a bit muddled. It seems nearly impossible to establish communication with the Spotting Top, & the G.C.T., as none of the telephones will work, & the part of the gas-phone that one presses against one's larynx gets red-hot.
>
> With everyone shouting & with gas masks & flash helmets, I should think things would get pretty strained.[59]

Finally, the investigation of specific gunnery problems noted in Appendix VII was not without penalty, and, in 1929, these investigations were reduced to a minimum so that 'Squadrons may be free to concentrate on achieving improved results in normal practices.'[60]

Whilst gunnery exercises were primarily directed at securing proficiency for a fleet action, shore bombardments

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[57]ADM 186/293, 'C.B. 3001/28,' p. 7.

[58]ADM 186/270, 'C.B. 981,' p. 15.

[59]Journal entry dated 8 June 1923, Madden Papers, NMM/MDN/1. G.C.T. is Gunnery Control Top.

[60]ADM 186/293, 'C.B. 3001/28,' p. 4.

were also conducted, as support for combined operations was a subsidiary task of naval gunfire. These shore bombardments included fires by both primary and secondary armament conducted at anchor and while steaming. To be sure, the number of practices held annually were never many and reached nil for all heavy ships in 1931.[61] In truth, the period 1929-1933 represented something of a nadir in the fleet's gunnery fortunes. In 1934, a renaissance, of sorts, began and experiments in long-range firing were initiated. Nelson and Rodney began firing at ranges between 27,000 and 37,000 yards, whilst Hood attempted to engage at ranges between 21,000 and 27,000 yards.[62] Of the 33 rounds fired during her shoot, Nelson secured between one and three hits.[63] Unfortunately, this pattern was not sustained during the following year,[64] and operational commitments during the Abyssinian Crisis and the Spanish Civil War precluded advances in gunnery drill meant to replicate a surface fleet action.[65] The practice envisioned was a consolidated target shoot to be held in 1938 by the Battle Cruiser Squadron and the Battle Squadrons of the Home and Mediterranean Fleets against two divisions of heavy ships represented by Iron Duke and Centurion towing four or five targets each, whilst cruisers were to engage high speed battle practice targets.[66]

Much of the experimentation in the gunnery and torpedo work of British heavy ships was spurred by the steps foreign naval powers were pursuing in their practices. Firing at several towed battle practice targets was initiated after the Admiralty learned of the drills that

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[61]ADM 186/309, 'C.B. 3001/31,' p. 77.

[62]ADM 186/323, 'C.B. 3001/34,' p. 6.

[63]ADM 186/328, 'C.B. 3001/35,' p. 8.

[64]ADM 186/338, 'C.B. 3001/36,' p. 12.

[65]ADM 186/349, 'C.B. 3001/38,' pp. 8-9.

[66]Ibid.

the United States Navy was conducting,[67] and firing at ranges above 30,000 yards was begun after several reports were received of long-range shooting by the navies of the United States, Germany and Japan.[68] Moreover, though the High Sea Fleet had coordinated the firing of the main and secondary armaments of its heavy ships against the same target during the 1914-1918 war,[69] and the Royal Navy practiced much the same as late as March 1930,[70] the procedure lapsed and was not renewed until late in the interwar period.[71] Given the increased ranges that secondary armaments were capable of reaching, the failure to maintain proficiency in such procedures was the direct result of the reduced manning levels in its ships and the need for economy.

In a like manner, steps were pursued to concentrate divisional torpedo fire in heavy ships, and the simultaneous concentration of torpedo and gunfire was an important component of fire tactics.[72] By 1924, both the Mediterranean and Atlantic Fleets were experimenting with long-range divisional control and developing the requisite communications procedures.[73] Again, the difficulty of controlling fire when encumbered with gas masks was most pronounced. The problem was most acute in the submerged flats which had difficulty in passing the required

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[67]ADM 186/258, 'C.B. 962,' pp. 32-33.

[68]Ibid., ADM 186/261, 'C.B. 971,' p. 56, ADM 186/289, 'C.B. 3001/27,' p. 75, and ADM 186/328, 'C.B. 3001/35,' p. 110.

[69]See M. W. Williams, 'The Loss of HMS *Queen Mary* at Jutland,' David McLean and Antony Preston, eds., Warship 1996 (London: Conway Maritime Press, 1996), p. 121.

[70]Journal entry 26 May 1930, Beaufoy-Brown Papers, LHCMA.

[71]ADM 186/349, 'C.B. 3001/38,' p. 33.

[72]ADM 186/66, 'C.B. 973,' p. 30.

[73]ADM 186/444, 'C.B. 0975,' p. 7.

information to the Torpedo Control Position located in the Tactical Plot.[74] The remedy, in this case, was to install range and bearing receivers which precluded passing information through telephones and voice pipes.[75]

Given its range and speed variables, use of the torpedo presented a firing solution problem of a different nature than gunnery. Not only was an appreciation required of where one's ship and the target were apt to be located in 20-30 minutes time, but the bearing and course of consorts had to be known at the time of firing and their future movements anticipated to preclude fratricide. Hence, the importance of the tactical plot. It is now appropriate to review the questions surrounding gunnery and torpedo concentration and the means of control employed during the 1919-1939 era.

Individual Ship Control (ACY). Individual ship control, or ACY, allowed multiple ships to concentrate on a single target by firing in discrete increments, or sectors, of time. During the initial postwar period, two methods of individual ship control had arisen.[76] The length of time between fires was dictated by the number of units firing and each ship controlled its own fire.[77] For two ships concentrating on a single target, the time between fires was 30 seconds, while for three ships firing the period was 20 seconds.[78] If four ships concentrated on a single target, the time between fires was reduced to 15 seconds.[79] For pair-ship firing, ACY was the prescribed

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[74]ADM 186/447, 'C.B. 982, Progress in Torpedo, Mining, Anti-Submarine, and in Allied Subjects, 1925,' Admiralty, Naval Staff, Torpedo Division dated August 1926, pp. 8-9.

[75]Ibid.

[76]ADM 186/257, 'C.B. 947,' p. 5.

[77]ADM 186/88, 'C.B. 3026,' p. 83.

[78]ADM 186/339, 'C.B. 3001/1914-36,' p. 49.

[79]Ibid.

method of concentration, though it was also retained as an alternate means of concentration for three or more ships firing in the event that communications were to fail when Master Ship Control was employed.[80] Firing by ACY was the primary method of concentration employed by battle cruisers and for Nelson and Rodney, the former employing it because the Battle Cruiser Squadron was frequently reduced to two ships for much of the period.[81] A problem unique to concentrating the fires of Nelson and Rodney was that the guns of the main armament could initially only be loaded in unison, and this limitation reduced theoretical maximum rate of fire possible.[82] As ACY shooting relied on timed sectors between salvos, a problem encountered when the opening range of an engagement grew was that the fall of shot could not be observed before the next salvo was due to be fired.[83] Use of a greater time sector allowed the range to be increased, but at a cost in the volume of fire. Conversely, a shortened time sector allowed a higher volume of fire to be developed, but restricted the maximum range at which control could be exercised.[84]

Master Ship Control (MSC). MSC, or Master Ship Control, was 'the system of control in concentrated fire when one ship is detailed as Master Ship, and the fire of all ships of the unit is controlled through her by the Master Control Officer.'[85] MSC firing promised to deliver the heaviest weight of fire on a target in the shortest possible time, and became the prescribed method of

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[80]ADM 186/258, 'C.B. 962,' p. 2.

[81]ADM 186/263, 'C.B. 977,' p. 13.

[82]ADM 186/293, 'C.B. 3001/28,' p. 88.

[83]ADM 186/289, 'C.B. 3001/27,' p. 8.

[84]ADM 186/339, 'C.B. 3001/1914-36,' p. 49.

[85]ADM 186/258, 'C.B. 962,' p. 2.

controlling the fires of multiple ships in 1923.[86] Two prerequisites in its use were the availability of uninterrupted wireless communications for passing ranging information from the master ship to the other ships in line and the availability of spotting aircraft.[87] Although wireless had been installed in heavy ships from 1917 for fire control purposes, MSC firing was eschewed in favour of ACY control until its reliability had advanced.[88] Concern that deliberate jamming of the shipboard Type 31 wireless set might disrupt MSC firing, and worries that wireless signals transmitted between ships could be intercepted by enemy direction finding, prompted the Service to experiment with very low frequency communications.[89] This required a heavy ship to trail a submerged antenna for signalling. Critical as communications were in MSC firing, visual signalling procedures were modified to allow control to be maintained in the event of a total failure in wireless communications.[90] Meanwhile, initial attempts at employing MSC procedures with a two-seater aircraft spotting had shown that the observer was not capable of performing all the duties required. Madden appraised Dreyer, the Service's foremost gunnery expert, of the problem:

> In a 2 seater the observer also reports fall of shot. He can send but he cant (sic) receive. Nor can he change wave, or if on the wrong target be corrected, or ordered to change target. With a single target this is not a great inconvenience because he cant (sic) well be wrong. But for efficient spotting in action the Master Ship must be able to talk as well as receive from the plane. This is only possible if one man devotes his entire attention to W/T hence

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[86]ADM 186/293, 'C.B. 3001/28,' p. 91.

[87]ADM 186/257, 'C.B. 947,' pp. 6-7.

[88]ADM 186/339, 'C.B. 3001/1914-36,' p. 48.

[89]ADM 186/257, 'C.B. 947,' p. 44.

[90]ADM 186/258, 'C.B. 962,' pp. 2-3.

the 3 seater.[91]

During MSC firing, the master ship, usually the lead ship of a division and called the datum ship, passed the estimated range to the other ships in line, and a correction for position-in-line was applied to compensate for each ship's position in the division.[92] By 1930, it became the practice to have the second ship in line assume the duties of the master ship. This change was based on an assumption that an enemy fleet was likely to concentrate its fire on the head of the British line, as was Royal Navy custom, and that, as a consequence, the lead ship might be unable to control divisional fire.[93] As experience was gained, it was found necessary for the master ship to provide the deflection for the target to her consorts, if the maximum rate of fire was to be developed.[94] Despite the difficulties of correcting for position-in-line, Master Ship Control was found superior to ACY control in both accuracy and volume of fire produced.[95] ACY control was retained, however, as it allowed ships to continue firing when MSC procedure failed in the controlling ship. When MSC procedure had been restored in that vessel or another consort, ACY control would be suspended.[96] Such a failure in MSC control could be assumed, if W/T transmissions from the controlling ship had stopped for 40 seconds, and if the

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[91]Madden letter to Dreyer dated 21 June 1920, Admiral Sir Frederic Charles Dreyer Papers, Churchill Archives Centre, Cambridge, DRYR/4/3. Original emphasis.

[92]ADM 186/289, 'C.B. 3001/27,' p. 14.

[93]ADM 186/304, 'C.B. 3001/30, Progress in Naval Gunnery, 1930,' Admiralty, Naval Staff, Gunnery Division dated March 1931, p. 16.

[94]ADM 186/270, 'C.B. 981,' p. 6.

[95]ADM 186/261, 'C.B. 971,' p. 8.

[96]ADM 186/270, 'C.B. 981,' pp. 15-16.

other consorts were seen to have stopped firing.[97] In such circumstances, the second, or if necessary, the third ship in line would automatically assume the duties of master ship.[98]

A risk when concentrating the fires of several ships was that any error introduced in estimating either the range or deflection by the master ship would be cascaded to the other ships in the division. To minimise such an event, consorts passed their estimated ranges and deflections to the master ship for plotting.[99] Another drawback associated with MSC control was that the direct observation of salvo splashes was complicated by the sheer volume of fire--upwards of sixteen 15-inch shells landing in close order.[100]

For its effectiveness, MSC firing depended on the presence of observation aircraft for spotting and initial practices were devoted to perfecting spotter-to-ship coordination procedures. Consequently, these trials exhibited a degree of contrivance, and the need to develop realistic procedures became evident. Until 1925, it had been customary for spotting aircraft to take station above the target.[101] This, whilst suiting the needs of the firing ships admirably was far removed from what could be expected during war. In 1926, it was established that the spotting aircraft should fly as high as possible, but, at a minimum, at an altitude which was at least half the range to the target.[102] This was later adjusted and by 1937 a height of

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[97]ADM 186/289, 'C.B. 3001/27,' pp. 14-15.

[98]Ibid.

[99]ADM 186/304, 'C.B. 3001/30,' p. 16.

[100]ADM 186/339, 'C.B. 3001/1914-36,' p. 50.

[101]Ibid., p. 40.

[102]Ibid.

8,000 feet was the norm for aircraft observing fire.[103]

Main Armament Control (MAC). A limitation in using a target ship such as Agamemnon was that it was not feasible to fire a heavy ship's main armament with service ammunition without destroying or severely damaging the target. Yet a target ship in speed and manouevrability afforded a degree of realism not attainable with a towed target. The compromise reached, Main Armament Control, employed the secondary armament in the shoot. Firing specially weighted HE shell, the guns were controlled by the ship's primary fire control system.[104] Unfortunately, whilst a 6-inch shell fired to 11,000 yards approached the descent of a shell fired by a 15-inch gun fired to 18,000 yards,[105] such a limited range allowed the firing ship to observe any 'overs'--something not typically seen in battle. The remedy introduced in 1923 was to install smoke boxes in Agamemnon. These boxes, controlled via wireless by an attending destroyer, masked this phenomenon and allowed for a more realistic shoot.[106]

Indirect Firing. In indirect firing, the object of the shoot was not observed by the firing unit or was only observed for the briefest of periods. Though the target could be a position ashore, the navy's primary interest in indirect fire was aimed at securing a tactical advantage during ship-to-ship encounters. During good weather, indirect fire, with the benefit of aircraft spotting or with a second ship employed for flank marking, would allow an engagement to commence beyond the line-of-sight of the firing ship. Alternatively, during periods of poor visibility, such as was found at Jutland, it would allow

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[103]Journal entry 17 October 1937, Rear Admiral Ottoker Harold M. St. John Steiner Papers, Imperial War Museum, London, IWM/PP/MCR/336.

[104]ADM 186/257, 'C.B. 947,' p. 41.

[105]Ibid.

[106]ADM 186/261, 'C.B. 971,' p. 12.

the engagement to continue.[107] The employment of smoke screens, whether surface or air delivered, by a fleet standing on the defensive made the refinement of indirect firing essential.[108] That said, practice for such an important drill was circumscribed, as the Admiralty report for 1926 makes clear, when not a single evolution was conducted by heavy ships.[109] A deficiency, of sorts, remedied the following year when one indirect fire was carried out by heavy ships.[110] In March 1919, Valiant began trials with the Henderson Director Telescope, a gyroscopically stabilised telescope mounted in the director tower. The instrument allowed firing to proceed against a ship masked by smoke or otherwise obscured, as long as a sighting could be made every two or three minutes,[111] and the horizon was clear.[112] Battleships and battle cruisers, when steaming, were limited to firing at a single target with their main armament by indirect fire though they could engage another target with their secondary armament by direct observation.[113] If at anchor, a heavy ship could engage two independent targets with indirect fire.[114]

Torpedo Control. The problem of employing torpedoes in heavy ships briefly discussed in Chapter Three was never adequately resolved during the period, and to Tennyson-D'Eyncourt's concern that they posed a risk to capital ship

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[107]R. A. R. Drax lecture 'Battle Tactics,' delivered 1 November 1929, Malta, Drax Papers, DRAX/2/2, p. 8.

[108]ADM 186/261, 'C.B. 971,' p. 10.

[109]ADM 186/271, 'C.B. 3001(26),' p. 10.

[110]ADM 186/289, 'C.B. 3001/27,' p. 10.

[111]ADM 186/244, 'C.B. 1561,' p. 19.

[112]ADM 186/148, 'C.B. 1769/30(2), Exercises & Operations,' Admiralty, Naval Staff, Tactical Division dated June 1931, p. 79.

[113]ADM 186/117, 'C.B. 3042,' p. 61.

[114]Ibid.

safety must be added the fact, that offensively, they never fulfiled their promise. Such were the conclusions drawn from exercises 'N.I.' and N.K.,' conducted by the Mediterranean Fleet in August 1927, which assessed that the offensive potential of a battlefleet's torpedo fire was doubtful.[115] Still, the lesson learned was that much as gunnery control required concentration to be effective, no less were the requirements of the torpedo arm. To wit,

> In Exercise "N.K.," the flotilla attacks of the retiring fleet caused the chasing fleet to manoeuvre in such a manner as to render any accurate forecast of his M.L.A. largely a matter of luck, and the promiscuous torpedo fire resulting from Individual Control proved of no practical value....the system of torpedo fire from the battlefleet has been redesigned with the idea of extending the methods of employment. The following types of zones with the necessary signals have been introduced:-
>
> (*a*) *Concentrated Zone*.--To obtain a torpedo concentration on an enemy whose movements are constrained and whose M.L.A. and speed can be forecast with moderate certainty.
>
> (*b*) *Parallel Zone*.--To obtain a broad torpedo zone, for use on an enemy whose M.L.A. is known within wider limits and where only small alterations from this may be expected.
>
> (*c*) *Split Zone*.--To obtain a divergent zone to counter a large range of avoiding action by the enemy.
>
> (*d*) *Continuous Zone*.--To obtain a succession of torpedo zones as a means of checking the advance of a chasing fleet by causing it to alter course continually if torpedoes are to be avoided.
>
> (*e*) Placing a zone to counter a reversal of course.[116]

The above control procedures were tested by the Mediterranean Fleet in August 1928 during exercise 'N.W.,'

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[115]ADM 186/461, 'C.B. 3002/27, Progress in Torpedo, Mining, Anti-Submarine, and Chemical Warfare, 1927,' Admiralty, Naval Staff, Torpedo Division dated July 1928, p. 9.

[116]Ibid. M.L.A. refers to Mean Line of Advance.

a repetition of the 'N.K.' exercise held twelve months previously, and resulted in more hits being obtained.[117] Such advancements in torpedo proficiency proved impossible to sustain, in part because of the personnel recommendations delivered in 1930 by the committee chaired by Admiral Forbes which investigated the communication's manning requirements in heavy ships. The Service had experimented with radio-telephony to control the fires of multiple ships. Yet, with reception poor and interference difficult to overcome, wireless was preferred.[118] Yet, removal of the wireless telegraphy sets dedicated to torpedo control based on the findings of the Forbes Committee, combined with the elimination of the after submerged flats in the Queen Elizabeth and Royal Sovereign-classes to allow a greater consignment of H.A. ammunition to be embarked, forced the abandonment of control by 'split zone' and 'continuous zone.'[119] Divisional control of torpedo fire by visual signals proved inadequate to the task, and, thus, individual control with its inherent shortcomings, had to be adopted.[120] The primary problem of visual signalling was that it proved difficult to distinguish signals meant to control the concentration of

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[117]ADM 186/468, 'C.B. 3002/28, Progress in Torpedo, Mining, Anti-Submarine and Chemical Warfare, 1928,' Admiralty, Naval Staff, Tactical Division dated June 1929, p. 8.

[118]ADM 1/8628/130, Commander-in-Chief, Atlantic Fleet letter No. 1119/A.H. to Admiralty dated 14 August 1922.

[119]ADM 186/481, 'C.B. 3002/30, Progress in Torpedo, Mining, Anti-Submarine, and Chemical Warfare, 1930,' Admiralty, Naval Staff, Tactical Division dated July 1931, p. 11.

[120]ADM 186/491, 'C.B. 3002/31, Progress in Torpedo, Mining, Anti-Submarine, and Chemical Warfare Defence, 1931,' Admiralty, Naval Staff, Tactical Division dated August 1932, p. 7.

gunfire from those signals hoisted to control torpedo fire.[121]

Still, there remained technical problems associated with the torpedoes themselves. Much time and effort were expended in trying to overcome the two principal problems that plagued heavy ship torpedo evolutions, gyroscopic failure and directional errors, but no satisfactory solution proved possible for battleships steaming greater than 18 knots.[122] Of the two problems noted, gyroscopic failure was the more worrisome as it might lead to a hit being registered against the next in line heavy ship of a column.[123] Problems of a different sort plagued battle cruisers, and the inability of Renown and Repulse to fire their torpedoes whilst at speed, unlike Hood, was viewed with dismay by Vernon as it precluded the Battle Cruiser Squadron acting as single tactical entity.[124] In the case of Renown, she was restricted from firing her torpedoes when steaming above 22 knots, whilst Repulse was restricted to a maximum of 20 knots when using the weapon.[125] In this case, the problems were the roll of the torpedo, the angle of deflection present, and the stress placed upon the submerged tubes and bars upon firing.[126]

Night-Fighting. The steady, evolutionary nature of the Service's tactical doctrine during the period is most clearly demonstrated by the eventual acceptance of a night

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[121]ADM 186/522, 'C.B. 3002/35, Progress in Torpedo, Mining, A/S Measures, and Chemical Warfare Defence,' Admiralty, Naval Staff, Tactical Division dated September 1935, pp. 6-7.

[122]ADM 189/49, 'C.B. 1770(29), Annual Report of Torpedo School, 1929,' p. 9.

[123]Ibid.

[124]ADM 189/44, 'C.B. 1705, Annual Report of Torpedo School, 1924,' p. 83.

[125]ADM 186/493, 'C.B. 3019, Torpedo Firing Manual, 1932,' Admiralty, Naval Staff, Tactical Division dated August 1932, p. 5.

[126]ADM 189/44, 'C.B. 1705,' p. 83.

action by heavy ships. Throughout most of the period, the navy eschewed the concept of seeking a night encounter amongst heavy ships, and this reluctance was confirmed by the many tactical exercises conducted. To wit,

> 164. Experience gained in night practices confirms the general principles governing the conduct of heavy ships at night as laid down in the Battle Instructions. No development has arisen to weaken the following conclusions:-
>
> (i) Night actions between heavy ships are usually not desirable.
>
> (ii) If we cannot count with certainty on engaging the enemy at daylight the following morning, strategy must decide whether the risk involved in fighting at night should be accepted for the sake of an immediate battle.
>
> (iii) The risks involved in pursuing after dark a beaten and disorganised enemy, will probably be slight in comparison with the advantages gained by denying him the opportunity of reorganising his forces.
>
> (iv) In the event of a chance encounter, a vigorous attack on the enemy vessels sighted offers the best chance of success.[127]

By 1938, the Service had embraced the idea of engaging in a fleet action at night.[128] The acceptance of night-fighting by the Service has at times been explained by the wartime experience of officers such as Chatfield, Fisher,[129] Godfrey,[130] and Drax.[131] With their promotion into the senior ranks of the navy, they were able to overcome the conservative dogma which held that such encounters were to

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[127]ADM 186/143, 'C.B. 1769/27(2),' p. 26.

[128]ADM 186/106, 'C.B. 01821,' p. 25.

[129]Robert Travers Young, The House that Jack Built: The Story of H. M. S. *Excellent* (Aldershot: Gale & Polden Limited, 1955), pp. 92-93.

[130]Beesly, Very Special Admiral, p. 82. John Henry Godfrey (1888-1971). Commanding Officer, Repulse (1936-1939); Director of Naval Intelligence (1939-1942).

[131]Cunningham, Sailor's Odyssey, p. 142.

be avoided by heavy ships. This is, at best, only a partial explanation. The decision to not only accept battle at night, but, in fact, to seek it was established at long last because British naval supremacy could no longer be maintained by numbers alone and night-fighting appeared tailor-made for a naval service composed of effectively trained long-serving professionals.[132] (This last point was more problematic as the number of night-firings held was, at times, extremely limited. For 1930, the Atlantic Fleet conducted but one.[133]) Moreover, the rubric that it favoured the weaker naval power at the expense of the stronger, as chance played a greater determinant, while true, no longer seemed to apply. At best, Britain would probably only be equal to an adversary in a future war, and could, indeed, be the weaker force.

This last point was confirmed in a series of fleet exercises that sought to develop the necessary tactics to allow the British fleet to successfully engage an enemy force that enjoyed an advantage in long-range gunnery. With only Rodney and Nelson able to engage ships beyond 30,000 yards, and with American, Japanese, and German ships known to enjoy such an advantage in gunnery, the results were disquieting to say the least. In April 1933, the Mediterranean Fleet tested the hypothesis in exercise 'R.R.' Red Fleet, consisting of five battleships, and enjoying a slight advantage in speed, but limited to firing its main armament to a range of 23,800 yards, engaged Blue Fleet, a force of four battleships able to fire to 32,000 yards. Both fleets were equal in cruiser and destroyer forces, and whilst Red was able to dispose of Blue's cruiser force in short order, the engagement of the opposing battlefleets brought grief to Red. It is worth reporting the summary of the action at length:

> 11. The two battlefleets came in sight

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[132]Chatfield, Navy and Defence, p. 240.

[133]ADM 186/304, 'C.B. 3001/30,' p. 6.

at 36,000 yards, and at 32,000 yards, Blue fired a few rounds. Red cruisers and destroyers then attempted to cover their battlefleet with smoke, but this did not prevent Blue deploying at a range of 29,000 yards, and bringing a four-ship concentration on to the Red *Revenge*....

12. Discounting the effect of Blue gunfire under these conditions, Red held his course for another twelve minutes, and then swung round to close at maximum rate. After 40 minutes under fire, he was able to open his foremost turrets, at 23,700 yards, but in this interval *Revenge* had been destroyed.

13. With the range down to 22,000 yards, Red turned to a parallel course to open his "A" arcs. Blue promptly turned away together to open the range, leaving only his after turrets bearing, but Red followed at once. By this manoeuvre Blue had opened the range 800 yards, but as Red was in pursuit, no advantage was to be gained by further retirement, and Blue turned back determined to close quickly to decisive range.[134]

The assessment concluded by advising that:

15. Unless the fleet with the shorter range guns has a large advantage in speed, or visibility is limited, the use of smoke appears to be essential in order to avoid damage, which may be serious, when closing a well-handled fleet armed with longer range guns.[135]

In the following year, 1934, an expanded exercise, 'Z.J.' was conducted by the combined Mediterranean and Home Fleets on the question. This time, of its five battleships, Red Fleet was allowed two whose maximum range exceeded 32,000 yards. They faced an equal number of Blue force battleships all enjoying the advantage of long-range

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[134]ADM 186/154, 'C.B 1769/33(2), Exercises & Operations, 1933, Volume II,' Admiralty, Naval Staff, Tactical Division dated April 1934, p. 9.

[135]Ibid.

gunnery.[136] If anything, the results were even more disconcerting. Red Fleet lost two battleships outright, two others were disabled to 50% and 25%, respectively, and Resolution was damaged but slightly. Blue Fleet's losses included the sinking of Nelson and damage of 50% and 25%, respectively, to Malaya and Barham.[137]

Still, in considering whether to accept a night action an appreciation of the circumstances at play was required. Thus,

> If contact between capital ships has not been made during the day, or if the day action has been indecisive, the Admiral will decide whether or not to seek a night action between capital ships. In making the decision the main factors to be considered are:-
>
> (*a*) Danger of losing touch with the enemy and being unable to bring him to action at daylight.
>
> (*b*) Geographical position of the forces.
>
> (*c*) Visibility and weather considerations.
>
> (*d*) Relative strength of the opposing light forces and their tactical position.
>
> (*e*) Enhanced fighting value of light craft at night as compared to that of capital ships.
>
> (*f*) Enhanced value at night of readiness and superior training and technique.
>
> (*g*) Increased liability of chance to influence results.
>
> (*h*) Possibility of surprise and the state of enemy morale as far as it is known or inferred.[138]

As visibility and unit recognition were at a premium during any night encounter, such engagements were likely to be fought at close range, be of limited duration, and be a confused affair in the extreme. As such,

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[136]ADM 186/155, 'C.B. 1769/34(1), Exercises & Operations, 1934, Volume I,' Admiralty, Naval Staff, Tactical Division dated November 1934, p. 19.

[137]Ibid., p. 23.

[138]ADM 186/66, 'C.B. 973,' p. 31.

> The primary object in any class of ship when committed to action by night, is to develop the maximum volume of gun and torpedo fire before the enemy can do so, and all other considerations are of secondary importance. It must be accepted that the result of night action may depend on the first minute or so, and that, if the most effective action is not taken immediately, it is unlikely that there will be time to recover.[139]

The above guidance was encapsulated in the expression, IPOMO, or the Instantaneous Production of Maximum Output.[140] As the target in an engagement was apt to be a light craft, an important consideration for capital ships during a night encounter was to ensure that the firing of the main armament did not interfere with the work of secondary batteries. Accordingly, broadside firing for the ship's main guns was usually prescribed.[141]

The need for early and rapid fire also included the use of torpedoes by heavy ships.[142] Yet, the combination of employing main and secondary armament, typical of firing at night, made torpedo control difficult due to the shock incurred in the tactical plot.[143] That battleships continued to retain a torpedo arm was to allow them to prevail in any encounter at night or during periods of limited visibility.[144] Still, realistic training during such periods was infrequent, as such conditions were also likely to result in the loss of any torpedoes fired.[145]

With the acceptance of night-fighting, another pillar

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[139]ADM 186/88, 'C.B. 3026,' p. 119. Original emphasis.

[140]Bacon, ed., Glorious Navy, p. 221.

[141]ADM 186/88, 'C.B. 3026,' p. 130.

[142]ADM 186/447, 'C.B. 982,' p. 9.

[143]ADM 186/448, 'C.B. 1694(4),' p. 6.

[144]ADM 186/481, 'C.B. 3002/30,' pp. 11-12.

[145]ADM 186/491, 'C.B. 3002/31,' p. 7.

for the retention of the battle cruiser was removed. Their lack of armoured protection made them singularly vulnerable to the shell fire of an opposing battlefleet, whilst their speed advantage was negated by the risk of collision with screening vessels. Such was the lesson drawn from 'A.G.,' an Atlantic Fleet exercise held on 10-11 September 1930.[146] Meanwhile, experiments with using detached forces to illuminate an opposing battlefleet with searchlight for the fire of a friendly battlefleet were tested. In the Mediterranean Fleet, exercise 'O.X.' held 29 October 1930, and 'B.A.,' an Atlantic Fleet exercise of March 1931, investigated the issue; while the illuminating vessels were ruled lost in the former exercise, the concept was thought worthy of further exploration.[147] In exercise 'P.C.,' conducted in August 1931, the Mediterranean Fleet expanded the original line of investigation. How brief a night encounter might be amongst heavy ships was demonstrated during the last named evolution. The cruiser HMS Curacao illuminated Queen Elizabeth between 2354-2357 hours which allowed Resolution, Royal Sovereign, and Royal Oak to independently engage for one minute's firing, whilst HMS Calypso managed to illuminate Queen Elizabeth between 0009-0017 hours which allowed the same previously named ships to engage for a four minute period.[148]

The Service's willingness to accept a night action was an attempt to mitigate through tactics her increasing strategic naval inferiority. This inferiority only worsened as the period progressed as the Service's ships could not be built to the dimensions of their rivals because of limitations in port facilities and the Suez

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[146]ADM 186/148, 'C.B. 1769/30(2),' p. 4.

[147]Ibid., p. 65.

[148]ADM 186/150, 'C.B. 1769/31(2), Exercises & Operations, 1931, Volume II,' Admiralty, Naval Staff, Tactical Division dated August 1932, p. 23.

Canal.[149] Given the restricted displacements of the second King George V and Lion-classes of battleships and their limited ammunition loads of eighty[150] and sixty[151] rounds per gun respectively, an engagement fought at long-range was no longer a tactical option for the Royal Navy. The only chance that British forces appeared to have was to seek a night or restricted visibility engagement and pass as quickly as possible through the danger zone.

Identification and Deception. As British procedures and components used during the late war for warship identification had been compromised, an immediate need was to develop and deploy a new system.[152] A second requirement was to field a system that mitigated the worst aspects of existing methods and procedures. Namely, in issuing a challenge, the querying ship announced not only its presence, but immediately conveyed whether it was a hostile or a friendly vessel. A condition most acute when visibility was less than the gun range.[153] The Admiralty response to the dilemma was to follow the familiar pattern of sitting a committee to investigate the issue in question, report on the technology available, and recommend the steps to be implemented. In this instance, the Committee on Recognition Signals, chaired by Rear Admiral

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[149]Joseph A. Maiolo, The Royal Navy and Nazi Germany, 1933-39: A Study in Appeasement and the Origins of the Second World War (Basingstoke: Macmillan Press, Ltd., 1998), p. 151.

[150]ADM 1/9394, 'Legend of Particulars of Proposed Battleship 14 P' dated 28 September 1936.

[151]ADM 1/9441, "Legend of Particulars of Proposed Battleships of the 'Lion' Class," dated 6 December 1938.

[152]'C.B. 1548, German Navy Tactical Orders,' dated April 1920 reproduced German fleet guidance on British identification procedures. See Jellicoe Papers, British Library, Additional MSS 49,005.

[153]ADM 1/8558/135, Captain Astley-Rushton letter to Rear Admiral G. H. Baird dated 5 October 1920.

G. H. Baird,[154] examined not only the familiar methods based on pyrotechnics and mechanical discs, but newer possibilities centred around wireless communications and lighting outside the visible spectrum--infra red and ultra violet. The latter offered much promise, by allowing ships to be fitted with recognition lights, visible through special filters, that would only burn when activated by a radio signal transmitted by the challenging ship. By 1922, a system was installed in Warspite and Barham and one observer noted:

> During the last few days we have had an expert from the Signal School on board to test a new method of making 'Visual' Signals, it is more or less the same as a normal projector except that it produces ultra-violet rays which cannot be seen by the naked eye, consequently a special sort of telescope is used for reading signals & the apparatus is apparently successful in practice as several signals were exchanged between the Warspite & ourselves by means of it.[155]

The above routine, rudimentary as it was, can be viewed as the progenitor of all future Identification, Friend or Foe systems.

Central to the issue of identification was to minimise the possibility of engaging one's own forces. One reason why the Service embraced night-fighting reluctantly was that existing methods and procedures were inadequate to the severe demands of such encounters. Following 'D.H.,' a Home Fleet November 1933 exercise, the Commodore, Destroyer Flotillas remarked:

> 20. After *Cairo* had been sunk, Blue destroyers were searching in the dark for Red battlefleet when *Versatile* gained touch with what she thought was Red battlefleet, and continued to shadow and report their

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[154]Sir George Henry Baird (1871-1924). Director of Mobilisation Department (1921-1923) and Commander, Destroyer Flotillas, Atlantic Fleet (1923-1924).

[155]Journal entry dated 18 November 1922, King Papers, IWM/90/23/1.

position until the end of the exercise. Actually *Versatile* was shadowing Blue battle cruisers, with the result that not only were all the remaining Blue destroyers making for the reported position but Blue battle cruisers also manoeuvred to engage the imaginary Red battlefleet.

21. This confirms my opinion that destroyers and capital ships cannot combine, in a night attack on enemy capital ships, without very serious danger of mistaking friend for foe, with possibly disastrous consequences.

It has long been accepted that a capital ship is justified in firing on any destroyer which is sighted at night in waters where enemy can be expected, and during a night attack on enemy capital ships every Destroyer Commanding Officer of the Attacking Force should be able to know that any capital ship sighted is an enemy.[156]

A corollary to identification was the desire to achieve a tactical advantage by means of deception. In exercise 'F.D.,' conducted 1 April 1923 in the Bay of Biscay, Blue Force composed, in part, by Hood and Repulse escorted a convoy of eighteen ships.[157] Each battle cruiser took the recognition signal of the other, and, in addition, Conquest, a three-funnel cruiser, disguised her fore funnel to appear as a two-funnel 'C' or 'D' class light cruiser.[158] Deception was facilitated further by using consorts to transmit the signals originating from the fleet commander. In exercise 'L.A.,' conducted 11-12 January 1928, the Commander-in-Chief, Blue Fleet flying his flag in Hood used HMS Amazon for such duties.[159] A second means employed to hide friendly unit identification from an enemy and to

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[156]ADM 186/154, 'C.B. 1769/33(2),' p. 4.

[157]Represented by HMS Greenwich, HMS Cyclops, HMS Vampire, and Assistance.

[158]Journal entry dated 1 April 1923, Elkins Papers, NMM/ELK/1.

[159]Journal entry dated 11 January 1928, Haggard Papers, IWM/85/21/3.

forestall successful plotting was to use false call signs, or to use separate call signs, for the reception and transmission of wireless traffic.[160] Beyond minimising a 'Blue-on-Blue' engagement, the aim of identification and deception was to provide an advantage in the tactical encounter.

Scouting and Reconnaissance. Through scouting and reconnaissance, the enemy fleet was located. All vessels and aircraft were to assist in this matter, and once touch was gained, it was to be maintained to ensure that the British battlefleet secured action with the enemy. Fleet experience, such as exercise 'J.D.' conducted in February 1926, confirmed that a fleet operating without battle cruisers was at a disadvantage when facing a force so equipped.[161] A system of group shadowing was perfected which allowed light forces, backed up by battle cruisers, to shadow a heavier enemy force;[162] a concept proposed by Dreyer and known as the 'elastic ring'.[163] Such procedures were adopted as a result of the fewer number of cruisers available and the increased use of destroyers in reconnaissance duties. The reduced number of scouting and reconnaissance vessels available also gave rise to tactics which merged the independent scouting and striking functions of cruiser forces into a single force.

The ranges over which scouting and reconnaissance were conducted increased throughout the period with the employment of aircraft. By 1929, given good weather, air searches to a range of 120 miles actual, representing 230 miles simulated, were not atypical,[164] and in the following

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[160]ADM 186/149, 'C.B. 1769/31(1),' p. 38.

[161]ADM 186/143, 'C.B. 1769/27(2),' p. 47.

[162]ADM 186/148, 'C.B. 1769/30(2),' p. 24.

[163]Rear Admiral J. H. F. Crombie letter to Roskill dated 1 August 1964, Roskill Papers, ROSK/7/163.

[164]ADM 186/145, 'C.B. 1769/29(1)' p. 44.

year air searches to a depth of a 164 miles actual were recorded.[165] This expansion of scouting and reconnaissance capabilities was captured in a contemporary report:

> The A K line used to be 5 miles ahead of the fleet; now it is 150. A battleship's torpedoes have a range of 10 miles; and aircraft carrier's torpedoes have at present a range of about 100. These are the sort of changes which have taken place--not to principles but to weapons--but they are changes which are by no means unimportant. With such an extended A K line, fleets can find each other more easily, and with such an increased range of torpedoes they can attack each other sooner. A slogan (which is now becoming well known) is that "there are three F's in naval warfare--FIND, FIX, and FIGHT. Aircraft do the first two and the fleet, assisted by its aircraft, does the third."[166]

Thus, by 1931, the Naval Staff anticipated fleet actions beginning when the main forces were some 100 to 200 miles apart. To cover such distances effectively, a minimum requirement was for the provision of 100 aircraft solely for reconnaissance purposes.[167]

Such advances, however, came at a price. Long-range navigation over open waters required that a homing beacon be transmitted by the carrier or a nearby consort to allow returning aircraft to locate the ship. This measure was necessitated by the general unreliability of magnetic compasses in aeroplanes of all-metal construction.[168] Thus, a fleet attempting to locate an opposing force through air search had to assume that its own presence would be

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[165]ADM 186/147, 'C.B. 1769/30(1), Exercises & Operations, 1930, Volume I,' Admiralty, Naval Staff, Tactical Division dated November 1930, p. 3.

[166]ADM 223/817, 'Confidential Admiralty Monthly Intelligence Report, No. 124,' dated 15 September 1929, p. 28. Original emphasis.

[167]ADM 1/9330, 'Staff Requirement Aircraft Carriers,' dated March 1931.

[168]ADM 186/149, 'C.B. 1769/31(1),' p. 35.

detected by the need to recover its aircraft. Moreover, the experienced gained in exercises such as 'Q.S.' and 'R.E.,' conducted by the Mediterranean Fleet in June and September 1932, respectively, highlighted that protection of the carrier force dictated that it must steam in close proximity to the battlefleet.[169] Thus, the possibility existed that through the use of air reconnaissance, a fleet would not only fail to find the enemy, but unintentionally announce its presence prematurely. The problem could be ameliorated by reducing the depth of the air search to no more than 60 miles. Yet, this sacrificed the very strengths of an air search--speed and range--over a search conducted by the A-K cruiser screen which was typically positioned 18 miles ahead and spread across the enemy battlefleet's anticipated line of bearing.[170]

While it is the case that scouting and reconnaissance were enhanced by the use of aircraft, weather was always a limiting factor in air operations,[171] and a noticeable feature of the combined fleet exercises of 1934 was that adverse weather precluded carrier air operations of any sort.[172] Moreover, the conduct of an air search, not unlike the use of other reconnaissance forces, could be a wasted effort, if an appreciation did not exist of where to allocate scarce resources. Hence, an important adjunct to the organic scouting and reconnaissance assets of the fleet was the fixed-station direction finding capabilities of the Admiralty. Their interception of enemy wireless traffic

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[169]ADM 186/152, 'C.B. 1769/32(2), Exercises & Operations, 1932, Volume II,' Admiralty, Naval Staff, Tactical Division dated July 1933, pp. 12 and 40.

[170]ADM 186/637, 'C.B. 1822,' p. 9.

[171]ADM 116/2173, Commander-in-Chief, Atlantic Fleet letter No.257/A.H.1124 dated 27 February 1922, ADM 186/149, 'C.B. 1769/31(1),' p. 3 and ADM 186/151, 'C.B. 1769/32(1),' p. iii.

[172]'Anon,' 'The Combined Fleet Exercises, 1934,' Naval Review, Volume XXII, p. 226.

would allow the fleet to narrow the axis of its search patterns. In 'Z.H.,' a combined fleet exercise held in March 1934, the importance of direction finding was established, and the Commander-in-Chief, Home Fleet recommended that:

> It is considered to be of importance that shore D/F stations should be established, wherever possible, so as to cover the probable area of naval hostilities, and that suitable intercommunication and plotting facilities should be available to enable enemy ships to be fixed by cross D/F bearings, and their positions signalled to forces at sea.[173]

By the end of the 1919-1939 period the navy viewed air reconnaissance as more than an adjunct to the surface scouting; it had become a means to reduce its total requirement in cruiser numbers, and with it, the Service confirmed the Air Ministry's argument of substitution.

Manoeuvre. Whether conducted at the unit, divisional, or fleet level, manoeuvre facilitated both offensive and defensive purposes. Through manoeuvre, individual ships took those stationing measures necessary to protect themselves while yet conforming to the tactical requirements of the squadron. The need for evasive action could be the result of telling gunfire, to avoid torpedo tracks, to disrupt a bombing attack, or in the case of battle cruisers, to present the best defensive inclination given their reduced armoured protection during the approach. At the fleet level, manoeuvre aimed to place the battlefleet at that range which maximised the offensive characteristics of British capital ships whilst affording the best protection against enemy shellfire. This, of necessity, required an assessment of British capital ship performance against rival warships. For example, in the case of a Queen Elizabeth-class encounter with a Japanese ship of the Fuso-class, the ideal range was estimated at 12,000 to 15,500 yards; the deadliest range for a vessel of

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[173]ADM 186/155, 'C.B. 1769/34(1),' p. 18.

the Queen Elizabeth-class against a Fuso was deemed to be 17,000 to 19,500 yards.[174] Thus, the British desire to close to a range of 12,000 to 16,000 yards was more than just an attempt to secure the greatest chance of hitting. It also coincided with the presumed zone of immunity for a certain class of British heavy ships against a specific enemy threat.

The Royal Navy was neither enthusiastic nor optimistic that a fleet action fought at distances of 27,000 yards and beyond was desirable. Hits were likely to be few and not worth the expenditure of ammunition required.[175] Probably for reasons of space and safety, the navy did not attempt to increase the ammunition allowance in its heavy ships; a measure the Japanese Navy had done when it began training in long-range gunnery when it increased its outfit per gun to 150 shells.[176]

It is a shibboleth of the dreadnought era, that the ideal tactical encounter was obtained when one fleet succeeded in crossing the 'T' of the opposing force. This allowed the crossing fleet to apply the maximum fire of its gunline by opening up the 'A' arcs whilst facing the smallest fire in return. As a theoretical construct this is correct. Left unsaid, however, is that such a manoeuvre assumed that the heavy ships of both fleets possessed offensive and defensive attributes of roughly equal value. In fact, this was rarely the case, and the calculation of the ideal range to be sought in an engagement could give rise to the need, as in the Queen Elizabeth-Fuso example, to accept an inferior tactical position during the approach in order to achieve the desired range. Thus, the claim that the ideal range for the British in any battlefleet

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[174]ADM 186/143, 'C.B. 1769/27(2),' p. 20.

[175]ADM 1/8658/69, 'Naval Tactics, 1924' Royal Naval College, Greenwich lecture delivered by Captain C. V. Usborne 27 June 1923, p. 10.

[176]ADM 186/338, 'C.B. 3001/36,' p. 96.

action was from 12,000 to 15,500 yards must be tempered with an understanding of what ships would be engaged and their specified zones of immunity.

Meanwhile, an unintended benefit of the reduced number of heavy ships in service was that it was possible to increase the stationing distance between ships from 2½ cables to 3½-4 cables. This increased the lateral frontage offered to torpedo attack by an opposing force, and, yet, did not unduly increase the overall length of the battleline.[177] Yet, what of the battlefleet? Was a concentrated battlefleet still the preferred tactical formation for action purposes? A criticism was expressed, at times, that the Service would be better served by adopting 'divided tactics.'[178] Such formations, it was argued, would allow the flag officers commanding the separate divisions of heavy ships more initiative and force the enemy to similarly divide to meet such a threat. The British fleet would then be able to reunite and crush the divided enemy.[179] Such tactics would also deny the enemy the ability to refuse battle by turning away from the British fleet.[180]

Officially, the navy never embraced 'divided tactics;' the battlefleet remained a single concentrated tactical force during the period. Of course, much would depend on how an enemy fleet was handled and the progress of the battle. Whilst the 'Battle Instructions' emphasised the need for flag officers to exercise initiative, the need to provide mutual support

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[177]ADM 1/8628/130, Commander-in-Chief, Atlantic Fleet to Admiralty letter No. 1119/A.H.1120 dated 14 August 1922.

[178]Amongst those who argued for 'divided tactics' were the brothers Dewar in their unpublished study of Jutland, 'C.B. 0938, Naval Staff Appreciation of Jutland.' See Additional MSS 49,042, Jellicoe Papers.

[179]ADM 1/8658/69, 'Tactics,' Royal Naval Staff College, Greenwich, Session 1922-1923.

[180]'Development of Tactics in Grand Fleet,' Royal Naval Staff College, Greenwich lecture by Captain H. G. Thursfield delivered 7 February 1922, Thursfield Papers, NMM/THU/107.

between battle squadrons and the requirement to maintain a concentrated fire against the enemy battlefleet, meant that the scope of freedom which 'divided tactics' required would only be present if the enemy fleet had been broken.[181] In many respects, the problem that the advocates of 'divided tactics' sought to correct had been solved through the diminished size of the battlefleet. A single concentrated formation was not likely to be as unwieldy as in the past, whilst division, in itself, might simply result in diffusion of effort. Moreover, such a formation would necessitate an increase in the screening forces required to protect the separated divisions over a battlefleet that remained concentrated.

Turning to the air threat, experience had shown during exercises that air attacks developed quickly and that it was not always possible to detect the sound of the approaching strike. A strong, effective anti-aircraft fire was seen as the best defence, and:

> The best defence of the fleet against air attack lies in offensive action against the enemy's air forces at the earliest possible moment.[182]

Screening forces were positioned several miles away from heavy ships and carriers to provide an advance warning of a pending strike and as an initial defensive barrier. Still, given the pace at which an air threat might develop, defensive fire might not be possible. A ship at speed and under radical helm was in a better posture to meet such a strike, but experience had shown that inside of 650 yards no amount of defensive manoeuvring would avoid a torpedo, whilst beyond 1,400 yards air-launched torpedoes could be

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[181]ADM 186/106, 'C.B. 01821,' Section VI, clauses 104-106.

[182]ADM 186/96, 'C.B. 01916,' p. 20.

combed in almost every case.[183] Moreover, the development of the magnetic torpedo and the buoyant bomb made the issue even graver,[184] and a measure of the risk involved for a ship was that any manoeuvre to be effective had to be initiated about 50 seconds prior to the anticipated bomb attack.[185] Finally, air strikes were deemed most dangerous at dusk or at dawn when the ship was silhouetted against the sky and aircraft could approach from out of the dark.[186]

During the 1914-1918 war, the accepted manoeuvre for combing a torpedo was the 'turn away.' Much time was spent during the interwar period on whether this represented the best course of action. With a surfeit of wartime torpedoes, the problem was investigated during exercises 'N.B.' and 'N.D.' conducted by the Mediterranean Fleet during June and September 1926.[187] These exercises allowed flotilla forces to actually develop a large-scale torpedo fire while testing the differing types of avoiding action tactics available to a battlefleet: individual manoeuvring action, the collective 'turn towards,' and the collective 'turn away.'[188] From these evolutions, it became accepted practice to turn towards an approaching torpedo strike and reduce speed when the angle of bearing was less than 60^0 on

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[183]ADM 186/317, 'C.B. 1915,' Plate No. 1, p. 6. This assessment was based on the prospects of avoiding a single torpedo.

[184]ADM 186/558, 'C.B. 1997(38), Report of the Committee on Damage Control and Admiralty Decisions on the Recommendations, 1938,' Admiralty, Material Finance Branch, p. 3.

[185]ADM 186/96, 'C.B. 01916,' p. 34.

[186]ADM 186/541, 'C.B. 3002/37, Progress in Torpedo, Mining, Minesweeping, A/S Measures, and Chemical Warfare Defence, 1937 Edition,' Admiralty, Naval Staff, Tactical Division dated October 1937, p. 16.

[187]C.B. 1734(2), Selected Reports of Tactical Exercises, etc - Spring and Autumn 1926,' Jellicoe Papers, Additional MSS 49,012.

[188]Ibid.

the bow, and to turn away and increase speed when the angle of bearing of the torpedo was greater than 60^0.[189]

For the fleet, manoeuvre served both offensive and defensive purposes. It allowed initial touch with the enemy to be gained and sought to exploit the advantages of wind and light conferred by a favourable tactical position, yet the benefits of the latter were not to be pursued at the risk of sacrificing the chance of a fleet action.[190] Once contact had been secured, the supporting forces of the battlefleet would endeavour to command the van and rear of the enemy fleet to allow British torpedo attacks to develop whilst denying the same to an adversary.[191] If the British battlefleet were superior to that of the enemy, the battle cruisers would assist in this task; if not, they would reinforce the battlefleet for the pending gun action.[192] With this, the doctrinal distinction that the battlefleet was formed by the union of battle squadrons only acting in concert was abandoned. This practice, in light of the experience of the 1914-1918 war, was the direct result of the reduced number of heavy ships available. It did not represent a fundamental reassessment in the battle cruisers offensive merits, and the general rule was that '[b]attle cruisers must not come under the gun fire of battleships...'[193]

Finally, the tactical justification of the battlefleet was that it concentrated in a single manoeuvre unit the fleet's offensive firepower. Yet, such concentration was not an end in itself, if an enemy naval force was not similarly disposed.[194] For one thing, it violated the

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[189]Ibid.

[190]ADM 186/106, 'C.B. 01821,' p. 62.

[191]ADM 186/143, 'C.B. 1769/27(2),' p. 15.

[192]Ibid., p. 18.

[193]ADM 186/154, 'C.B. 1769/33(2),' p. 5.

[194]ADM 186/117, 'C.B. 3042,' pp. 2-3.

principle of economy of force. Thus, whether the British battlefleet had a future as a tactical entity was in large measure contingent on who the next naval war would be waged against and the naval strategy adopted by that power. If the enemy in question attempted to pursue either a 'command of the sea' or 'fleet-in-being' strategy, the battlefleet would be retained; if the naval foe pursued a strategy of guerre de course, then British heavy ships were likely to be dispersed as escorts to convoys. The last requirement being necessitated by the general weakness of British cruisers compared to their foreign counterparts.

Previously, when contact between battlefleets had been secured, the supporting destroyers of the British force assumed station on the disengaged side of the battlefleet. From this position, they stood clear from the fire of the battlefleet, yet, were ready to pass through the British line to repel an attack by the flotilla forces of the enemy or to launch their own assault.[195] Given its estimation for the range to be sought in a fleet action, and the likely advantage in long-range firing its rivals would enjoy, British flotilla forces were expected to mask the battlefleet's approach through the use of smoke during a daylight action. Of necessity, this placed her screening forces betwixt the two battlefleets and made any use of the torpedo by heavy ships impractical. There were a host of reasons why the torpedo arm of battleships lost favour. Yet, beyond the pressing need for additional space to be allocated for anti-aircraft ammunition storage, the difficulty of their use from submerged flats whilst steaming at speed, and the difficulty of maintaining an effective plot whilst a heavy ship's guns were in action, was that given the type of encounter expected, there remained little scope for their effective use once the decision was confirmed to accept a close-range action against the superior ships of an enemy battlefleet.

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[195]ADM 186/636, 'C.B. 1716,' p. 51.

The Exercise Programme of the Royal Navy. With concentration of fire the goal, individual ship evolutions could not by themselves secure proficiency in battlefleet tactics. Experience was necessary in performing squadron-level evolutions. By 1924, the development of MSC firing had progressed to the point that the First Division of the First Battle Squadron was able to experiment with redistributing an ongoing fire plan against an enemy battle squadron represented by Tiger towing three battle practice targets.[196] In a shoot lasting 43 minutes, the fire plan was changed and a new distribution ordered. This resulted in a hiatus of over two minutes while the new plan was signalled and the ranges passed from the controlling ship. From this interruption the principle was laid down:

> "That an enemy should not be permitted to remain unfired at for so long as, on the average, over two minutes whilst a redistribution of the fire of a division is being arranged.
>
> "Whatever methods are in use, fire should not be checked on an enemy already engaged if she is to be re-engaged by the same unit in the new distribution of fire.[197]

During the period, large-scale strategical exercises were conducted on a regular basis, though it was not until exercise 'Z.D.' held in March 1931 that the combined Mediterranean and Atlantic Fleets actually practised in a sustained manner for the first time since the war.[198] Beyond allowing the Royal Navy to develop and refine its tactical doctrine against a specifically defined threat, these evolutions provided a chance to test new tactical concepts on a scale that most approximated active service conditions in peacetime. Just as specific gunnery problems were examined, so the attempt was made to explore broader

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[196]ADM 186/263, 'C.B. 977,' pp. 6-7.

[197]Ibid.

[198]ADM 186/149, 'C.B. 1769/31(1),' p. 23.

tactical problems such as the ideal range to be sought for in a fleet engagement,[199] the means of securing the defence of aircraft carriers,[200] and the likely 'Forms of Battle'.[201] The last mentioned defined a series of set piece encounters between opposing battlefleets including:

Form A. Battle on similar courses.
Form B. Circling action.
Form C. Forcing a decision by gunfire.
Form D. Chase.
Form E. Retiring tactics.
Form F. False deployment.
Form G. Dictating deployment.[202]

Forms 'A' through 'D' were the tactics to be employed when the British fleet was the superior force, whilst Forms 'E', 'F', and 'G' were the tactics to be adopted when the Royal Navy was the weaker fleet.[203] If a criticism of the Royal Navy's tactical doctrine of the 1914-1918 war was that it assumed that fleet action would always conform to an engagement fought along parallel lines, then the development of 'Forms of Battle' was one means amongst several that attempted to redress this failing.[204]

That said, certain investigative themes were de

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[199]ADM 186/154, 'C.B. 1769/33(2),' p. 8.

[200]ADM 186/157, 'C.B. 1769/35(1) and (2),' p.

[201]Unlike the gunnery problems investigated and specified in Appendix VII, the tactical problems surveyed have not survived. That such problems were dealt with in a systematic manner is borne by the passing references made to their existence in the series 'C.B. 1769, Exercises & Operations.'

[202]'ADM 186/143, 'C.B. 1769/27(2),' p. 6. n.b., 'C.B. 01821, Battle Instructions,' discusses 'Forms of Battle' somewhat differently and omits four of the forms which were covered under 'Naval Tactical Notes, Volume II.' As this important series has not been located, the above reference is preferred.

[203]ADM 186/143, 'C.B. 1769/27(2),' p. 6.

[204]'Jutland I,' lecture delivered in 1932 by Commander C. S. Daniel to Royal Air Force Staff College, Andover, Tennant Papers, NMM/TEN/41/5.

rigueur and formed essential elements in many fleet exercises. Amongst such recurring themes were the exercising of ships in their war routine, defence against chemical attack, and:

a. the escorting of a slow moving convoy;[205]

b. the defence of trade routes or of a commercial focal point;[206]

c. the passage of a fleet through narrow waters;[207]

d. a single fleet operating in the vicinity of two separate enemy forces which collectively are the stronger;[208]

e. a fleet with damaged ships attempting to retire in the face of a fleet that is not so encumbered;[209]

f. a fleet action fought late in the day and the steps required to ensure a recommencement of the action at first light;[210]

g. a battlefleet, screened or unscreened, attacked by, aircraft, cruisers and light

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[205]January 1922 'E.A.,' January 1923 'F.A. and 'F.B.,' March 1923 'F.D.,' January 1925 'H.B.,' August 1926 'N.C.,' January 1928 'L.A.' and 'N.P.,' March 1928 'L.C.,' January 1929 'M.A.,' March 1929 'M.Z.,' June 1929 'O.D.,' June 1931 'P.A.,' and June 1932 'Q.S.'

[206]May 1928 'L.D.,' March 1931 'Z.D.,' January 1933 'D.A.,' June 1933 'R.T.,' and March 1935 'Z.L.'

[207]October 1923 'F.J.1,' March 1927 'K.G.,' September 1927 'N.O.,' September 1929 'M.G.,' January 1933 'R.N.,' and March 1933 'Z.E.5.B.'

[208]February 1922 'E.D.1,' March 1922 'E.F.,' March 1927 'K.F.,' June 1927 'N.H.' March 1929 'M.Z.,' January 1930 'A.A.,' March 1930 'O.P.,' and April 1932 'Q.P.'

[209]February 1922 'E.D.2,' February 1926 'J.D.' and August 1928 'N.V.'

[210]July 1925 'M.Q.,' 1928 'N.Q.,' March 1930 'Z.C.,' and October 1930 'O.X.'

forces;[211]

h. the risk posed by a retiring fleet's torpedo fire to a chasing fleet;[212]

i. the defence of a fleet in an unprotected anchorage against air attack;[213]

j. the screening of a battlefleet by Asdic equipped escorts.[214]

k. a fleet action fought between heavy ships that wish to fight at different ranges.[215]

Of the eleven recurring themes listed, (e), (f), (g), and (h) above can be viewed as attempting to learn from Jutland, but what of the others? Whilst themes (a) and (b) have antecedents in the general naval experience of the 1914-1918 war, topics (c), (d), (i), (j), and (k) were more contemporary in nature, and (d) can be viewed as an attempt to test the utility of 'divided tactics'. Collectively, the themes were an attempt by the Service to address operational and doctrinal deficiencies revealed by the

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[211]February 1922 'E.D.3.,' April 1922 'E.M.,' October 1922 'E.P.1' and 'E.Q.,' March 1925 'H.G.' and 'H.H.,' July 1925 'M.Q.,' January 1926 'J.C.,' March 1926 'J.G.' and 'J.H.,' July 1926 'J.K.,' September 1926 'J.L.1,' March 1927 'K.E.,' September 1927 'K.P.,' January 1928 'L.B.1' and 'L.B.2,' August 1929 'O.J.,' October 1929 'N.1,' February 1930 'A.C.,' April 1930 'D.A.' September 1930 'A.J.,' October 1930 'A.N.,' February 1931 'D.X.2,' January 1932 'Q.I.,' March 1932 'Q.K.' and 'Q.M.,' April 1933 'R.S.,' August 1933 'R.X.,' June 1934 'E.C.,' January 1935 'S.S.' and 'D.X.15,' and June 1935 'F.C.'

[212]August 1927 'N.I.' and 'N.K.,' August 1928 'N.W.,' September 1930 'A.H.,' October 1930 'O.V.,' April 1931 'D.,' and August 1932 'R.C.'

[213]October 1929 'O.L.,' October 1930 'O.Y.,' January 1931 'O.Z.,' May 1931 'B.B.,' January 1932 'Q.B.,' January 1933 'R.K.,' January 1935 'S.S.,' and June 1935 'A.D.S.'

[214]July 1926 'J.K.,' September 1927 'N.O.,' January 1928 'N.P.' and 'L.A.,' September 1928 'N.X.,' May 1929 'O.C.,' and November 1929 'A.R.'

[215]March 1929 'O.A.,' April 1933 'R.R.,' and March 1934 'Z.J.'

experience of war while preparing for the next presumed conflict--war in the Far East. To that end, a fleet of slow moving ships escorting a convoy of tankers and an accompanying MNDBO would have to pass through a series of constricted waters including the Straits of Gibraltar, the Suez Canal, the Bab el Mandeb, the Gulf of Aden, and, thence, through the Straits of Malacca, or the Sunda Straits. During passage, it may have sustained damage if attacked by air, surface, and submarine forces and require temporary repair. Alternatively, it might have to operate from an advance anchorage that had been previously surveyed, but not readied, whilst Singapore and Hong Kong were invested. Hence, the MNDBO would secure the anchorage whilst defects were made good and the battlefleet and accompanying carriers defended the harbour against a potential air attack delivered by bomb, torpedo, and gas. At some point, the Main Fleet would seek junction with Local Defence Forces and the ships of the China Station and attempt to engage the Japanese Fleet. Depending on the situation on the ground, it might have to offer battle immediately or attempt to disengage from an intact Japanese force. Finally, the Main Fleet might have to offer battle in the face of a Japanese battlefleet that enjoyed a marked superiority in long-range gunnery.

Variations to the above were practised by combining one or more of the themes together. Whilst they were developed to prepare for an Anglo-Japanese war (from a strategic standpoint, the worst naval case) addressing as they did the major naval issues of the era, they had validity for any other naval war posited. The experience gained from gaming the above themes showed that the carrier was a potent offensive weapon that vastly improved the scouting and reconnaissance of the fleet and was capable of inflicting an early and lethal blow against an enemy naval force. They also highlighted that the carrier was, herself, extremely vulnerable and prone to being lost early in any engagement. This phenomenon was captured by the

Rear Admiral, Aircraft Carriers following exercise 'Z.P.2,' a combined fleet exercise held in March 1938:

> 119. In my opinion the outstanding features of the exercise as far as the air is concerned are:-
>
> (a) The early destruction of both carriers...
>
> 120. Both carriers were sunk or out of action due to air attack within two hours of the exercise having commenced, *Glorious* at 0808 and *Courageous* at 0858.[216]

This vulnerability dictated that all ships including the battlefleet must be prepared to defend the carrier force. Moreover, the carrier was not at risk solely from air attack from her opposite number. Fleet exercises confirmed that the carrier was at risk from cruiser and destroyer forces. During 'R.E.,' a Mediterranean Fleet exercise conducted in September 1932, the actions of the Blue force were limited to defending Glorious from such attacks once its carrier had been located.[217] Yet, the carrier had, at times, to leave this protective veil to recover her aircraft due to prevailing wind conditions. Time and again, this manoeuvre resulted in her loss as she was exposed to air, surface, and submarine attack. Similarly, these evolutions also showed that heavy ships were vulnerable too. Yet, the battlefleet did not have to conform her movements to the vagaries of the wind. Damage or loss could be sustained by individual heavy ships, and yet might not prove catastrophic to the overall effectiveness of the battlefleet. The same was unlikely to be true in the case of the of an aircraft carrier.

Until exercise 'K.F.' in March 1927, no attack against a fleet at sea had exceeded 60 miles radius from the launching carrier.[218] Definitive analysis is difficult as the depth of reconnaissance and strikes were frequently

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[216]ADM 186/159, 'C.B. 1769/38,' p. 14.

[217]ADM 186/152, 'C.B. 1769/32(2),' pp. 39-40.

[218]ADM 186/143, 'C.B. 1769/27(2),' p. 24.

limited to balance the speed restrictions applied to surface ships. Still, set against the steady improvement shown by carrier operations stands the combined fleet exercises of 1934 when air operations of any sort were precluded.

Summary. The primary objective of Royal Navy tactical thinking during the interwar period was to ensure superior firepower during any fleet-to-fleet encounter. This goal resulted in the development of multiple ship concentration firing and the doctrine that all naval forces should direct their attention to the primary striking arm of the enemy, his battlefleet, and ensure its destruction. The direct antecedents for such tactical precepts were the inconclusive surface actions of the 1914-1918 war and the belief that ship-to-ship encounters weakened the collective fire of the fleet and that subsidiary naval forces had focused too much of their attention on their defensive responsibilities at the expense of their offensive potential.

It is a canard that the Service was consumed with re-fighting the Battle of Jutland to the exclusion of more relevant topics. Rather, it was committed to rectifying known operational deficiencies highlighted during the late war whilst preparing for its next encounter. The Service possessed a deep appreciation of tactical theory, even if its exercises were not always realistic representations of naval warfare. It gamed scenarios at the Tactical School and made use of its Staff and War Colleges to provide independent assessments, prior to testing precepts in fleet manoeuvres. Its exercise programme benefited from being able to test the major tactical issues concerning the capital ship in two major fleets operating in close proximity, but under differing oceanographic and meteorological conditions. The irony is that from a tactical viewpoint, the one encounter the Royal Navy had consistently trained to meet was the one she was least prepared to deal with when conflict came due to her

commitments in Home, Atlantic and Mediterranean waters: war with Japan.

Extrapolating the results of fleet strategical and tactical exercises was, of necessity, a leap in the dark. Expected battle conditions were difficult to ascertain, opposing forces could not actually be engaged, and the need for economy forced most scenarios to be tested over an extremely limited period. The casualty tables provided in 'C.B. 3011, War Game Rules,' were written to reflect the assessment of immediate battle damage in tactical evolutions and were not necessarily a proper instrument for depicting the strategic import of battle damage. A heavy ship might expect to lose several knots due to a torpedo hit, or lose a certain percentage of offensive striking power due to bomb damage, but would it continue to operate with the fleet once an immediate encounter was over? The rules remained silent.[219] Criticism can be leveled that the casualty tables assumed that capital ships had greater resilience and staying power than was warranted by the experience of the 1914-1918 war. In this there is much truth, yet this allowance was probably compensation, in turn, for the tendency of aircraft and submarines to initiate attacks against heavy ships from ranges that were considered wholly unrealistic for the conditions likely to be found during wartime. Moreover, any officer playing 'Blue' could not escape that he was schooled in the ways of 'Red', and his ships were, at best, British units attempting to mirror the capabilities of a foreign navy.[220]

At the tactical level, the Royal Navy made a concerted effort to enhance the proficiency of the fleet, in general, and its heavy ships, in particular. It accepted the principle of night-fighting, integrated the use of the naval air arm into its fleet doctrine, and developed improved anti-submarine measures, of which Asdic was but

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[219]ADM 186/157, 'C.B. 1769/35(1) and (2),' p. 49.

[220]ADM 186/78, 'C.B. 3011,' p. 12.

one component. It pursued gunnery and torpedo proficiency to the practical limits of the day's technology, and sought to compensate for its growing strategic inferiority through enhanced tactical prowess. By the end of the period, it recognised the inherent weakness of the battle cruiser and moved towards the adoption of the fast battleship in its place. Its exercise programme, constrained by the needs of economy, still managed to investigate the major tactical issues that would face the Royal Navy in a future war based on a realistic assessment of the likely naval foe. From this, it deduced that heavy ships were at risk from air, surface, and underwater attack and that the gun was still superior to the torpedo.

The view that the navy had reverted to a nineteenth century way of life and suffered from a leadership malaise is hard to reconcile at the tactical level.[221] Such a charge would have merit, if the Service had been blessed with unlimited resources and faced no operational distractions. The record, of course, is that it was constrained, and it was stretched by its operational commitments. The deployment of Argus, the only active carrier in Home waters, to the Near East at the time of the Chanak crisis curtailed the exercise programme of the Atlantic Fleet,[222] whilst the scrapping of Agamemnon curtailed gunnery proficiency in 1927.[223] In 1928, Centurion replaced Agamemnon.[224] Its withdrawal from the Fleet Target Service in 1931 again hindered the gunnery practices in both the Atlantic and Mediterranean Fleets.[225] Operating far fewer carriers than heavy ships, the investigation of any

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[221]Walter J. Boyne, Clash of Titans: World War II at Sea (New York: Simon & Schuster, 1995), p. 24.

[222]ADM 186/258, 'C.B. 962,' p. 22.

[223]ADM 186/289, 'C.B. 3001/27,' p. 3.

[224]ADM 186/293, 'C.B. 3001/28,' p. 4.

[225]ADM 186/309, 'C.B. 3001/31,' p. 5.

tactical problem involving aircraft was hampered by the need to respond to emerging operational commitments. It was not vision the Service was lacking; it was numbers and finance. Pound's plea for the Mediterranean and Atlantic Fleets to operate two carriers each was in recognition that it was difficult to script a meaningful exercise where only one side possessed an air arm.[226] Finally, the admission by one senior officer that:

> I know nothing, absolutely, of Fleet Tactics, or of handling a Fleet. During my two years in Princess Royal, 18 months of which were during the War, all the Tactics called for at sea were practically embraced in "Turn together four Points to Port," and, ten minutes later, "Turn together four Points to Starboard."[227]

says more about the tactical competency of a single officer than it does about the collective ability of the Royal Navy.[228] Long before the United States adopted 'aggressor' units to enhance tactical realism in ground and air training, the Royal Navy had adopted the practice of dressing vessels and men in the manner of an opposing naval force.[229]

Fundamentally, training in tactics involves a degree of conjecture. Conjecture, not only in how weapons will perform, but on the constraints imposed by policy and strategy. A navy that assumes submarine warfare will be waged in accordance with the restrictions of the London Submarine Protocol of 1936 will train differently than one

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[226]ADM 1/8733/38, Assistant Chief of Naval Staff un-numbered minute dated 29 September 1928.

[227]Admiral John Kelly letter to Keyes dated 14 April 1926 cited in Halpern, ed., Keyes Papers, Volume II, pp. 177-178.

[228]Kelly's general indifference to tactical and strategic matters is confirmed in a letter by Admiral Sir William M. James to Roskill dated 15 May 1964, ROSK/7/163.

[229]See photograph produced in The Times dated 26 March 1926, Beaufoy-Brown Papers, LHCMA.

which expects to face unrestricted submarine warfare. At the tactical level, the Royal Navy made two key assumptions about the future of naval warfare, subsequently proved false, which favoured the retention of the capital ship and justified its place within fleet doctrine. First, it assumed that the next naval war would be fought in a chemical environment, and one of the first measures taken at the time of the Abyssinian Crisis was to ship decontamination stores from Britain to Malta for use by the Mediterranean Fleet and the local dockyard.[230] It trained assiduously to meet this threat and confirmation that the Italians had employed mustard gas during its Abyssinian campaign made this assessment appear more valid than ever.[231] Moreover, it recognised that France, Turkey, Germany, Russia, Japan, and the United States had an offensive chemical weapons capability.[232]

The second key assumption made was that, notwithstanding the importance of the aircraft carrier to fleet operations, a fleet action would continue in the event of their loss or damage. Such an assumption had merit for training purposes when the need to exercise ships, aircraft, and personnel in their war routine over a prolonged period was an important consideration. However, the assumption implied that a foreign naval power would continue to seek battle rather than disengage if such loss occurred, and unconsciously confirmed that the final arbiter in a surface action remained the capital ship.

Finally, in scripting its fleet exercises contact between opposing battlefleets typically followed the commencement of the evolution after the briefest of time allotted for scouting and reconnaissance. This was the

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[230]Admiralty letter M.03317/35 to Commander-in-Chief, Portsmouth et al. dated 24 August 1935, Roskill Papers, ROSK/7/144.

[231]ADM 189/56, 'C.B. 1770(36), Annual Report of Torpedo School, 1936' dated 27 January 1937, p. 61.

[232]Ibid.

result of having the fleets in close proximity to each other, itself made necessary by the limited time allowed for each exercise due to the need to minimise the steaming of ships. This unwittingly benefited the reconnaissance of surface forces, lessened the distinctive differences between air and surface reconnaissance, and made the aircraft carrier appear more vulnerable to surface action than it probably was.

That said, the exercise programme of the interwar Royal Navy confirmed the risks that surface naval forces faced from the air threat. They also confirmed the risks presented by the submarine, the mine, and other surface vessels. Against aircraft, ammunition expenditure was shown to be prodigious during exercises, manoeuvre of limited value, and early warning essential.[233] The place of the capital ship, particularly the battleship, in the tactical doctrine of the Royal Navy was not due to an ill-appreciation of the air threat or a fundamental misreading in the capabilities of the fleet's tactical air arm. Rather, it stemmed from an appreciation of the risks facing all naval warships, the type of encounter to be sought, the type of encounter most likely to occur, and the need to have general purpose forces capable of sustaining operations in differing theatres under various climatic conditions. It was also the result of having to make do with the forces one had at hand, and here, the disputed and divided control of naval aviation played a central part. It may be the case that the Air Ministry met the general requirements of the navy.[234] Yet, it is surely the case that after April 1918 the Service was no longer in a position to adequately define its requirements and subject the naval air arm to the same degree of tactical examination as the traditional branches of naval warfare. Air policy and

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[233]ADM 186/157, 'C.B. 1769/35(1) and (2),' p. 110 and p. 142.

[234]Hezlet, Aircraft and Seapower p. 114.

expertise had become the prerogatives of the Royal Air Force.[235] The absence of an effective naval staff element for most of the interwar period devoted to examining aviation matters at the tactical level was the root cause,[236] and what stands out from the 'Confidential Books' devoted to gunnery and torpedo matters is the almost total lack of a corresponding series devoted to progress in naval aviation.[237]

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[235]Brown, Warship Losses, p. 14.

[236]In 1923 a mere two officers formed the Air Section of the Naval Staff. See Sir Charles Walker minute C.E.119/27 dated 17 February 1927, Roskill Papers, ROSK/7/48. On 1 January 1929, the Naval Air Section was reformed as the Naval Air Division. See Office Memorandum No. 55, C.E.4369/28 dated 13 August 1928, Roskill Papers, ROSK/7/51.

[237]'C.B. 983, Progress in the Fleet Air Arm,' ADM 186/560, 'C.B. 3003(26),' ADM 186/561, 'C.B. 3003/32, Progress in the Fleet Air Arm, 1932,' Admiralty, Naval Staff, Naval Air Division, dated June 1933, and ADM 186/562 'C.B. 3003/34, Progress in the Fleet Air Arm, 1934 Edition,' Admiralty, Naval Staff, Naval Air Division, dated April 1934 represent the sole exceptions to this shortcoming. 'C.B. 983,' has not been located.

CHAPTER VII

THE CAPITAL SHIP RECONSIDERED: ASSESSMENT

It is very hard to remember that events now long in the past were once in the future.[1]

Maitland

Emerging from World War One victorious, the Royal Navy could not be complacent about its performance during that conflict. Its success owed more to force of numbers and the contribution of allied armies than to its own tactical performance and material readiness. In this, no criticism is implied; it merely reflects that when a maritime power faces a continental adversary, it must frequently adopt the means of the latter if it is to prevail. That said, based on its war experience, the Service addressed the immediate shortcomings identified in shell performance, took the first systematic steps to coordinate gunnery and torpedo fire, improved its command and control methods, and attempted to capture the vital lessons of the war through an extensive historical survey directed by the Naval Staff.[2] The Navy proved itself open to innovation and embraced naval aviation from the earliest days of the 1914-1918 war, but experience had shown that the air weapon though increasingly essential in supporting naval operations was not central. By conflict's end, the capital ship was still

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[1]Frederic Maitland cited in A. J. P. Taylor, The Origins of the Second World War (New York: Atheneum, 1983), p. 231.

[2]Beyond the official history prepared by Julian Corbett and Henry Newbolt, this survey was reflected in three major series of Admiralty publications: 'C.B. 1515,' 'C.B. 917,' and 'C.B. 1585.' The first, a technical history series, comprised no less than 51 volumes and addressed such topics as the role of convoys, the control of mercantile shipping, and technical improvements in gunnery. 'C.B. 917' and 'C.B. 1585,' Naval Staff Monographs,' surveyed such issues as the Tenth Cruiser Squadron, Baltic Sea operations, and operations in the Atlantic Ocean area.

viewed as the final arbiter of naval power, and the battlefleet remained the preferred tactical instrument in a fleet action.

Peace brought retrenchment and reduced the numbers borne, but the principle that the heavy ship was the keystone of naval power was generally accepted within the Service, though much discussion centred around the size required to perform its strategic function. The corporate position reached during the Post-War Questions Committee was that it must be the equal of its main rivals, and this view was codified in the Washington Naval Agreement, the London Naval Agreement of 1930, and the London Naval Agreement of 1936. During the 1919-1939 period finance was the determinant of British naval power. The Naval Estimates dictated the number of officers and ratings carried by the Service, determined the number of ships held in commission in the active fleet, influenced the scale of naval operations planned and conducted, established the pace and degree of ship alterations and modernisations, and affected the level and complexity of tactical training. The Service's finances also dictated that the arms control process was pursued as much for economic reasons as for any political or strategic rationale, and the true import of finance is revealed by the telling statistic that prior to any naval agreement, the Royal Navy retained only sixteen heavy ships in full commission.[3]

Within this context, British naval strategy followed a 'command of the seas' approach in Home and Mediterranean waters whilst pursuing 'fleet-in-being' and 'guerre de course' approaches in subsidiary theatres. In support of such a strategy, British naval forces were organised into Local Defence Forces, Detached Forces and the Main Fleet centred upon the two principal fleets: the Atlantic and Mediterranean operating in unison. Capital ships were the backbone of the Main Fleet and stood ready to reinforce any

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[3]ADM 1/8616/218, Plans Division unnumbered minute dated December 1921.

station. Flexibility and adequate intelligence were vital as Britain could not afford to follow a 'command of the seas' strategy on a global basis. If necessary, operations would be conducted sequentially in separate theatres by the Main Fleet to meet multiple threats arising simultaneously. Given her estimate of the various naval threats and the types of forces held by the differing powers, the strategy adopted was a realistic approach that satisfied the defence of empire within tight fiscal limits.

At the operational level of naval warfare, the capital ship proved itself a most valuable unit. Whether 'showing the flag,' conducting missions of surveillance, providing support to Home or Colonial policing efforts, or as a visible symbol of deterrence, battleships and battle cruisers were adept at meeting a broad range of operational commitments in a manner not available to any other type of warship. Still, the Service's employment of heavy ships was never dogmatic. It seriously considered reducing the numbers operated in the active fleet to offset the costs of reintroducing sail training, and its willingness to decommission units to meet more pressing operational deficiencies in areas such as mine and anti-air warfare are evidence of such flexibility in thought. Moreover, the Royal Navy's use of capital ships frequently owed more to availability than to necessity, and the threat faced by heavy ships during operations of such a limited nature, not likely to be representative in scale and duration of what might be expected in general war, masked the import of operational experience. Sometimes, limited experience may be worse than no experience.

Finally, from 1935 onwards the Navy's operational commitments during the Abyssinian Crisis and the Spanish Civil War came at the expense of its tactical training programme. The actual import these crises had on heavy ship divisional training is difficult to measure. Still, that they did exact a price can be inferred from contemporary Admiralty reports on exercises and operations

which increasingly covered the evolutions of the America and West Indies and China Stations where previously the Mediterranean and Home Fleets had featured so prominently.[4]

At the tactical level, the Royal Navy sought to enhance the fighting skills of its ships, aircraft, and submarines by correcting deficiencies highlighted in the war while testing new methods and procedures. Central to the Service's tactical thinking was the concentration of all arms operating in mutual support against the main striking arm of the enemy: the battlefleet. For heavy ships, such concentration was provided by gun and torpedo fire. In the prospect of having to face capital ships which enjoyed an advantage in long-range gunnery, the Navy's remedy was to opt for battle at night or during periods of reduced visibility. Its tactical exercise programme showed carriers and submarines to be formidable weapons. It also showed them to be weapons with severe limitations and, in the case of the carrier, highly vulnerable and prone to early loss in any naval engagement. A strong contributing factor to the retention of the heavy ship was the belief that the next fleet action would be fought in a chemical warfare environment where the aircraft carrier was singularly vulnerable to the effects of such an attack.

Constrained as it was by finance and its diverse operational commitments, the exercise programme of the Royal Navy was still able to address the major tactical issues in extant relating to the capital ship. It discounted the value of 'divided tactics,' accepted the superiority of the gun over the torpedo, and recognised the general weakness of the battle cruiser in the face of the battleship.[5] It is ironic that the navy which commissioned Dreadnought, the first large all-calibre warship which made

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[4]See in particular ADM 186/157, 'C.B. 1769/35(1) and (2).'

[5]ADM 186/154, 'C.B. 1769/33(2),' p. 5.

long-range firing possible, discounted such tactics by the end of the interwar period. That it did, confirms that of the major naval powers, the Royal Navy was probably the least committed to the capital ship concept by the end of the interwar period due to the necessity of having to operate on a global basis and the costs of building such ships. Still, its willingness to accept severe limits on the size of capital ships has to be viewed in the context of an overall desire for arms control, and the period is notable for such British proposals as the elimination of the submarine, the constraints placed on cruiser and carrier forces, and the anticipated abolition of military and naval air forces.[6]

On balance, the capital ship controversy operated at several different levels. Beyond the inter-Service arguments over substitution, the relative costs of competing weapons, and the risks posed by air, surface, and underwater threats, the Service's view of the capital ship was framed by its operational experience, its tactical doctrine, and the strategic environment. Its conclusion that the capital ship remained the arbiter of naval power was a reasonable assessment given the capabilities of competing alternatives and the need to prepare for war against navies of differing capabilities. Finally, it is well to remember that a navy goes to war with the fleet that it has and not with the fleet that it wished it had. Seapower does not come cheap, and any navy is the product of previous investment; the Royal Navy's plight of the late interwar period was the harvest of under-investment. Drax addressing the assembled officers of the Mediterranean Fleet at Malta in 1929 sensed something of this--that the twilight of the Royal Navy was at hand, and that its call on the nation's resources could no longer be taken for granted:

> The public feel, quite wrongly, that the idea of making the enemy's coastline our

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[6]Clive Wigram minute dated 11 June 1932, Roskill Papers, ROSK/7/122.

maritime frontier is now no longer feasible. It is very desirable to show, to them and to our enemies, that the same spirit and the same possibilities exist to-day as in the days when Nelson's fleets so well exemplified that fine old maxim "the trident of Neptune is the sceptre of the world". We all recollect how, according to the poet, "The Assyrian came down like a wolf on the fold". In just the same manner one would like to see the British fleets and squadrons going out to war when the call comes. This is all the more desirable because it would be very fitting to have a really fine finish to the great days of our Naval history.[7]

Implicit in Drax's plea is the understanding that, unlike the late war, the Service must perfect the instruments that it has and not assume that new means will be provided. The capital ship was one such instrument--indeed, the primary naval instrument, and it is to the Service's credit that it perfected its use during the 1919-1939 era within the limits afforded by treasury and treaty.

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[7]R. A. R. Drax lecture 'Battle Tactics,' delivered 1 November 1929, Malta, Drax Papers, DRAX/2/2.

APPENDIX I

FILES NOT HELD AT THE PUBLIC RECORD OFFICE RELATING TO THE CAPITAL SHIP CONTROVERSY

Donald Cameron Watt assessing the Anglo-German Naval Agreement some ten years removed from the Second World War wrote a perceptive piece offering an interim judgement.[1] This writer, in surveying the interwar capital ship controversy, is reminded that all history is revision and that definitive conclusions must be tempered with reservation. A question not asked received no answer. To that extent, history is merely the progress of successive interim judgements. The one question this work has attempted to address is, 'Notwithstanding financial and treaty limitations, to what degree was the Royal Navy committed to the capital ship based on its operational experience and interwar tactical development?' The answer provided by this work is primarily based on a review of the official files surviving supplemented by personal journals, diaries, and correspondence. Yet, gaps exist in the official record, and, of the many files missing, the following are the more salient:

'Naval Tactical Notes, Volume II'
'C.B. 906, Gunnery Subjects,'
'C.B. 934, Naval War Manual, 1921,'
'C.B. 937, Action Plotting, 1921,'
'C.B. 974, Naval Bombardment,'
'C.B. 999, Naval Intelligence,'
'C.B. 999A, Naval Intelligence, Appendix,'
'C.B. 1540, Ordnance Committee Report, 1919,'
'C.B. 1541, Ordnance Committee Report, 1920,'
'C.B. 1546, Mediterranean Naval Operations, 1920,'
'C.B. 1551, Gunnery, Volume III,'
'C.B. 1560, Ordnance Committee Report, 1920,'
'C.B. 1564, Battleship Gunnery Practices, 1920,'
'C.B. 1570, Ordnance Committee Report, 1920,'
'C.B. 1574, Summary of Tactical Exercises, 1920,'
'C.B. 1575, Summary of Torpedo Exercises, 1921,'

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[1]D. C. Watt, 'The Anglo-German Naval Agreement of 1935: An Interim Judgement,' The Journal of Modern History, 28, 1956, pp. 155-175.

'C.B. 1579, Battleship Gunnery Practices, 1921,'
'C.B. 1582, Summary of Bombardment Practices, 1921,'
'C.B. 1587, Summary of Torpedo Practices, 1921,'
'C.B. 1591, Summary of Tactical Exercises, 1921,'
'C.B. 1593, Ordnance Committee Report, 1921,'
'C.B. 1601, Tactical Manual, 1921,'
'C.B. 1609, Battleship Gunnery Practices, 1922,'
'C.B. 1621, Summary of Tactical Exercises, 1922,'
'C.B. 1633, Summary of Tactical Exercises, 1923,'
'C.B. 1646, Commodity Chart Japan, 1924,'
'C.B. 1650, Gunnery Practice in Capital Ships, 1924,'
'C.B. 1656, Summary of Tactical Exercises, 1924,'
'C.B. 01661, Annual Report of Chemical Warfare, 1924,'
'C.B. 1663, Summary of Tactical Exercises, 1923,'
'C.B. 1684, Commodity Chart France,'
'C.B. 01685, Ordnance Committee Report, 1923,'
'C.B. 1687, Report of Bombarding Practices, 1923,'
'C.B. 1690, Gunnery Practice in Capital Ships, 1925,'
'C.B. 1693, Summary of Tactical Exercises, 1925,'
'C.B. 1843, Gunfire Communications,'
'C.B. 3016, Progress in Tactics,'

As the above records have not been found, it is difficult to rank their relative importance to a fuller appreciation of the capital ship controversy. Still, given its citation in the 'Battle Instructions,'[2] that it addresses in detail 'Forms of Battle, E through G,' and the partial contents that have survived in the Admiralty Secretariat series,[3] 'Naval Tactical Notes' must be deemed one of the most important of the missing files.

In addition to the above known records, one can surmise based on an appreciation of British naval procedures that other files were most likely produced but have failed to survive. Included in this series would be the Admiralty letters of instruction issued to the Commanders-in-Chief of the major fleets specifying the strategical setting of an exercise--in short, what power was being represented by 'Blue Fleet,' where was the action occurring, in what year was the action occurring, and what specific ships of 'Blue Fleet' were being portrayed. Moreover, annual reports should have been produced by the

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[2]ADM 186/106, 'C.B. 01821,' p. 3.

[3]ADM 1/9387.

Tactical School summarising the issues investigated based on questions forwarded by the Admiralty and the fleets, and the Air Section of the Naval Staff should have produced a summary of yearly tactical progress in naval aviation.[4] Beyond the gunnery issues investigated and specified in Appendix VII, a series of tactical issues were investigated during the period by the fleets and probably also by the Tactical School. The nature and number cannot be determined but it is known that the following specific issues were addressed:

> a. How best to gain and maintain the range at which it is desired to fight.[5]
>
> b. Protection of aircraft carriers from attacks by surface ships. (Issue was withdrawn in 1935).
>
> c. Protection of aircraft carriers when operating with a detached force. (Issue identified in 1937).

Additionally, investigation of the following issues can be inferred based on their reference in the Confidential Book series summarising the Service's exercise programme:

> a. How best to escort a composite force (including battleships) which is exposed to attack by battle cruisers and light forces.[6]
>
> b. The effects produced by destroyers, submarines, and torpedo aircraft in a daylight pursuit.[7]
>
> c. To test the organisation of a destroyer force before contact is made at night.[8]

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[4]It is know that no summary was produced in 1933 and at least one 'Progress in Naval Aviation' was prepared as a staff memorandum in March 1921. See Roskill Papers, ROSK/7/46.

[5]ADM 186/154, 'C.B. 1769/33(2),' p. 8.

[6]ADM 186/143, 'C.B. 1769/27(2),' p. 44.

[7]Ibid.

[8]Ibid., p. 46.

d. How to cover the retreat of a damaged battle cruiser in the face of a superior fleet.[9]

e. To investigate the best form of screen to be adopted at night against a force of cruisers and destroyers aware of the approximate position of the battlefleet.[10]

f. To investigate the possibilities of shore bombardment by a raider.[11]

g. To investigate the use of cruisers with a large torpedo armament.[12]

h. How to screen a fleet from submarine attack by surface craft and aeroplanes acting in unison.[13]

i. To investigate the refueling of aircraft by submarines at sea.[14]

j. How several aircraft carriers should operate together.[15]

k. A surface action between two fleets one composed of battleships and battle cruisers and the other composed of battleships.[16]

l. The tactical use of anti-submarine vessels against submarines of the proposed G-class.[17]

m. An investigation into the danger of

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[9]Ibid., p. 50.

[10]Ibid.

[11]Ibid.

[12]Ibid.

[13]Ibid.

[14]Ibid.

[15]ADM 186/145, 'C.B. 1769/29(1),' p. 2.

[16]Ibid.

[17]Ibid.

torpedo fire from a retiring fleet.[18]

n. The tactics of attacking a heavily defended convoy.[19]

o. How to retain touch with an enemy when an action has been joined late in the day.[20]

p. The tactics of a fleet superior in light craft but weaker in gun power covering the retreat of damaged vessels.[21]

q. How to defend a fleet in harbour against air attack.[22]

r. The use of divisional formation in a destroyer night attack.[23]

Finally, while the periodic reports of the Naval Staff recount in a distilled manner the significant findings of the era's exercises, what is largely missing is the analysis and comments that each commanding officer would have provided to his immediate superior for consideration and inclusion in squadron or divisional reports to the fleet commander.

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[18]ADM 186/146, 'C.B. 1769/29(2), Exercises & Operations, 1929, Volume II,' Admiralty, Naval Staff, Tactical Division dated June 1930, p. 5.

[19]Ibid.

[20]Ibid.

[21]Ibid., p. 6.

[22]Ibid., p. 10.

[23]ADM 186/148, 'C.B. 1769/30(2),' p. 4.

APPENDIX II

NAVAL ESTIMATES OF THE INTERWAR PERIOD

YEAR	AMOUNT	SOURCE	ADJUSTED BUDGET
1918-1919	£356,000,000	Kennedy	
1918-1919	325,000,000	1/8744/140	
1919-1920	188,000,000	1/8744/140	
1919-1920	172,798,776	Ferris	
1920-1921	112,000,000	Kennedy	
1920-1921	96,590,181	Ferris	
1920-1921	84,372,300	116/1831	
1921-1922	91,180,000	1/8614/187	
1921-1922	91,186,869	Ferris	
1921-1922	91,186,869	1/8744/140	
1921	80,000,000	1/8614/187	75,280,000
1921	75,986,141	Brassey	
1922	56,000,000	Brassey	52,192,000
1922	65,000,000-	Ranft	56,460,560
1922	57,492,389	Brassey	53,582,906
1922-1923	86,340,000	1/8614/187	
1922-1923	64,883,700	1/8802/89/35	
1922-1923	69,476,657	Ferris	
1923	52,000,000	1/8614/187	47,216,000
1923	54,064,350	Brassey	49,090,429
1923-1924	58,000,000	Ranft	
1923-1924	61,401,165	Ferris	
1923	61,401,165	1/8744/140	55,752,257
1924-1925	59,693,251	Ferris	
1924	55,693,787	Brassey	51,015,508
1925	60,004,548	Brassey	55,024,170
1925-1926	64,443,000	Ferris	
1926	62,313,728	Ferris	56,830,119
1926	57,142,862	Brassey	52,114,290
1926-1927	58,000,000+	Roskill	
1927	58,000,000	1/8724/68	55,564,000
1927	58,123,257	Brassey	55,682,080
1928	57,139,146	Brassey	54,396,466
1929	55,865,000	Roskill	54,021,455
1929	55,865,000	1/8739/40	54,021,455
1929	55,987,770	Brassey	54,140,173
1930	51,739,000	Roskill	51,739,000
1930	52,274,186	Brassey	52,274,186
1931	50,605,000	Roskill	53,185,855
1931	51,014,752	Brassey	53,616,504
1932	50,476,300	Roskill	53,353,449
1932	50,164,453	Brassey	53,023,826
1932-1933	50,195,388	1/8802/89/35	
1933	53,570,000	Roskill	57,641,320
1933	53,500,000	Gibbs	57,566,000
1934	56,550,000	Roskill	61,130,550
1934	56,550,000	1/8800/78/35	61,130,550
1934	56,580,000	Gibbs	60,081,980
1935	60,050,000	Roskill	65,034,150

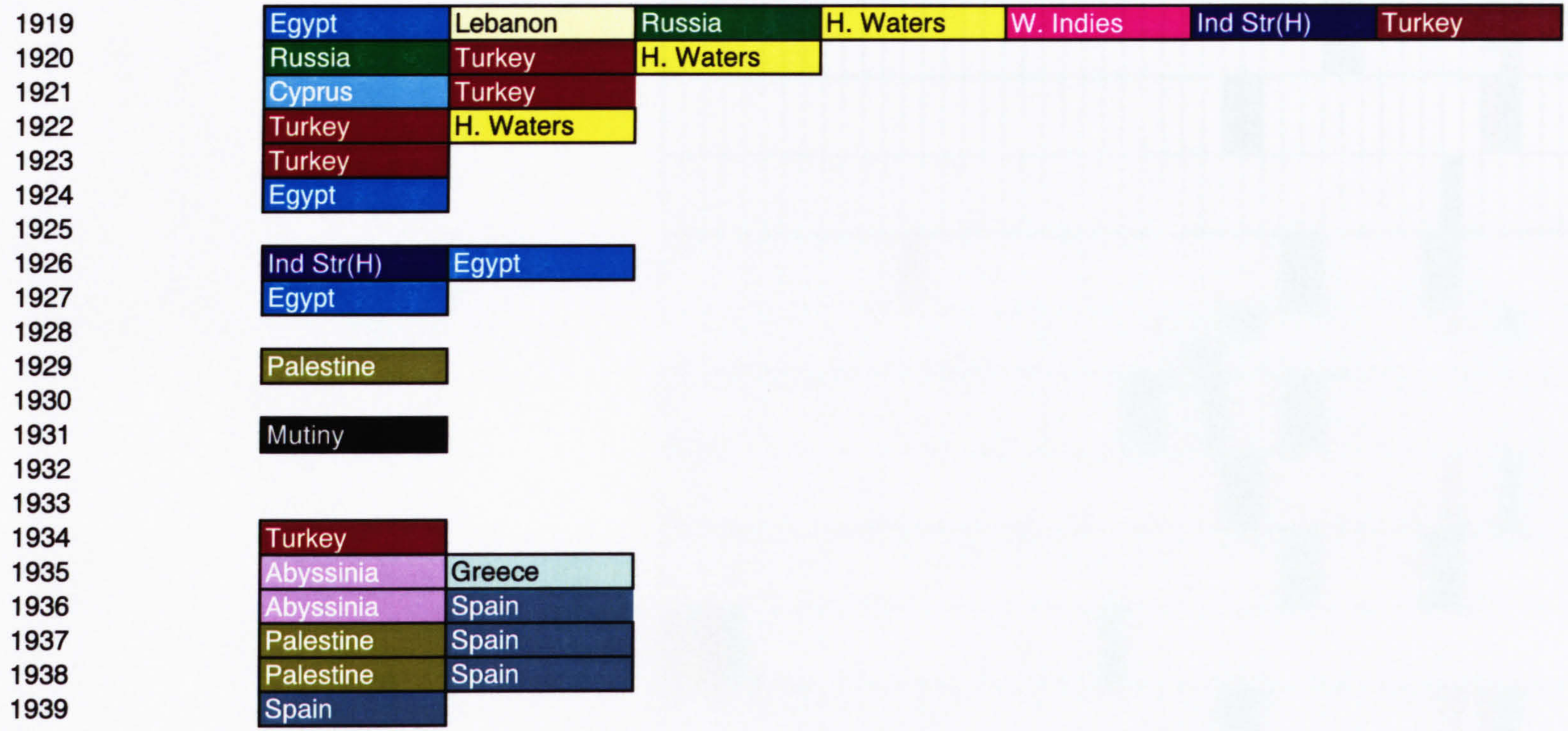
NAVAL ESTIMATES OF THE INTERWAR PERIOD
(continued)

1935	64,806,000	Gibbs	70,184,898
1936	81,289,100	Roskill	87,548,360
1936	81,092,000	Gibbs	87,336,084
1937	78,065,000	Roskill	82,280,510
1937	77,950,000	Gibbs	82,159,300
1938	96,117,500	Roskill	103,518,540
1938	95,945,000	Gibbs	103,332,760
1939	99,429,000	Roskill	
1939	97,960,312	Gibbs	

The figures for Adjusted Budget are derived from John Stevenson British. Society 1919-45 (Middlesex: Penquin, 1984). The calculations are those of the author of the dissertation.

1919	Turkey	Arabia	Russia	Portugal	Adriatic	Cuba	H Waters	Lebanon	Eire	Germany	W Indies	Ind Strike	Eygpt
1920	Turkey	Eire	Russia	China	Somalia	Samoa	H Waters	Ind Strike					
1921	Turkey	China	Egypt	Eire	India	Cyprus	Ind Strike						
1922	Turkey	H. Waters	Egypt	Eire	In Str (C)	China	Arabia	Russia					
1923	Turkey	Lithuania	China	In Str (Ce)	Bahrain	Mexico							
1924	Egypt	In Str (NF)	Mexico	China									
1925	Turkey	In Str(C)	China	Persia	Ocean Is	Jordan							
1926	Turkey	Egypt	China	Portugal	Ind Strike								
1927	China	Egypt	Portugal										
1928	Samoa	China	Kuwait	Arabia									
1929	Palestine	Persia											
1930	W Indies	Samoa	Egypt	Arabia	China	Brazil	Peru						
1931	Mutiny	Arabia	Cyprus	Portugal	China								
1932	China	Greece	Newfound	Brazil	Salvador								
1933	Persia	China											
1934	Turkey	Arabia	China	Persia	Norway								
1935	Abyssinia	China	Greece										
1936	Abyssinia	Palestine	Spain	Rhineland	China								
1937	China	Spain	Palestine										
1938	China	Czech	Spain	Palestine	Austria								
1939	China	Albania	Czech	Poland	Spain								

AREAS OF ROYAL NAVY OPERATIONAL EMPLOYMENT DURING THE INTER-WAR ERA



AREAS OF CAPITAL SHIP ACTIVE SERVICE EMPLOYMENT DURING THE INTERWAR ERA

APPENDIX V

	Aden	Argentina	Australia	Brazil	Canada	Cuba	Denmark	Fiji	France	Gambia	Germany	G Coast	H K	Iceland	India	Iraq	Jamaica	Japan	Kuwait	Malaya	Mexico	Monaco	NZ	Norway	Panama	Persia	Philip Is	Portugal	S Leone	Somoa	Sweden	Turkey	US	USA	W Indies	Total
1918																								N Zealand												1
1919			Australia	Renown	N Zealand			N Zealand	Barham						N Zealand		N Zealand								N Zealand					N Zealand				N Zealand		Temeraire	15
				Renown	Renown				Q E																								Renown		N Zealand	
																																			Renown	
1920	Malaya		Renown			N Zealand	Hood	Renown			Malaya				Renown		N Zealand				Renown		Renown	Hood	Renown					N Zealand	Hood		Renown		N Zealand	21
							Tiger																	Tiger							Tiger				Renown	
																								Temeraire												
1921	Renown														Malaya				Renown	Malaya						Renown										7
	Malaya														Renown																					
1922				Hood									Renown		Renown			Renown		Renown							Renown									Hood	9
				Repulse																															Repulse	
1923							Hood		Hood															Hood					Hood		Hood			Hood		12
							Repulse																	Repulse					Repulse		Repulse			Repulse		
																								Thunderer												
1924			Hood		Hood			Hood							Hood		Hood			Hood			Hood		Hood					Hood			Hood			19
			Repulse		Repulse			Repulse							Repulse		Repulse			Repulse			Repulse							Repulse			Repulse			
1925		Repulse								Repulse		Repulse																Hood	Repulse					Repulse	Repulse	8
																												Repulse								
1926																																				0
1927			Renown					Renown									Renown						Renown		Renown				Barham						Renown	7
1928																													Barham							1
1929																																Q E				1
1930														Rodney										Nelson												4
																								Barham												
																								Malaya	Rodney											5
1931																								Repulse	Nelson										Rodney	5
																								Renown											Nelson	
1932																																			Hood	2
																																			Repulse	
1933							Warspite																													1
1934																																			Malaya	5
																																			Rodney	
																																			Nelson	
																																			Valiant	
1935														Nelson																					Barham	4
																																			Hood	
																																			Nelson	
1936																																				0
1937																								Rodney								Repulse				2
1938																					Repulse											Warspite				2
																																Malaya				
1939																																Warspite				1

APPENDIX VI

OFFENSIVE CHEMICAL WARFARE IN THE ROYAL NAVY

Whilst no direct evidence exists that the Royal Navy deployed chemical shells as an offensive weapon during the 1919-1939 period, it developed such means, if for no other reason than to possess a retaliatory capability in the event of its use by another naval power. With this in mind, the Admiralty advised the fleet in 1931 that:

> All Service schools and commands are authorised to study the offensive use of gas, since this is necessary to the study of protection against gas, and also that we may be in a position to retaliate immediately should the use of gas be forced upon us by our opponents.[1]

During the 1914-1918 war, the Royal Navy manufactured chemical weapons as a response to the enemy's submarine campaign. However, they were never fielded operationally and were disposed of at the end of the conflict.[2] Word that the United States Navy was continuing in its efforts to develop an offensive chemical weapons capability prompted Beatty to bring the matter to the Cabinet's attention where he argued that the development of such weapons for naval purposes had become a vital matter.[3] Confirmation of the continued American interest in chemical weapons was received when Chatfield was shown film of the recent Army Air Service strikes against former German warships at the time of the Washington Naval Conference.[4]

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[1]ADM 186/82, 'C.B. 3021,' p. 2.

[2]ADM 116/1775, First Sea Lord un-numbered minute dated 7 May 1920 to Cabinet.

[3]Ibid.

[4]ADM 1/8615/207, Assistant Chief of Naval Staff statement to British Empire Delegation dated 9 December 1921.

A limited capability was retained for defensive training purposes and manufactured at the Poison Gas Factory, Sutton Oak and by the British Dye-stuffs Corporation located at Dalton, Huddersfield.[5] Beyond the periodic training of personnel in defensive measures at the ashore gas schools located at Portsmouth, Devonport, and Chatham, personnel were trained aboard a vessel dedicated to chemical warfare: HMS Boadicea.[6] In May 1927, a full scale demonstration on the effects of chlorine gas was conducted at sea against Tiger whilst,[7] offensively, the Admiralty made available a quantity of 4-inch to 18-inch obsolescent shells to the Chemical Warfare Committee.[8]

Most powers were signatories to the 1925 protocol which prohibited the use of chemical weapons. Still, the British government intended to seek an understanding from any state which was not a party to the agreement, if it found itself at war with that country.[9] Confirmation that Italian forces had used mustard gas in Ethiopia gave the issue fresh impetus, and in 1937, the Government concluded that it must be prepared to wage offensive chemical warfare and directed each of the Services to consider the use of chemical weapons.[10]

Notwithstanding Beatty's argument that the development of an offensive chemical weapons capability was deemed vital, the Service deprecated its place in naval artillery except for use in support of shore bombardments by a heavy

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[5]ADM 116/2393, Committee of Imperial Defence, un-numbered minute dated 18 January 1929, Appendix No. 5, pp. 1-2.

[6]ADM 1/8618/1, undated and unnumbered memorandum regarding Anti-Gas Training in the Navy.

[7]ADM 189/47, 'C.B. 1770(27),' p. 97.

[8]ADM 186/251, 'C.B. 1594,' p. 54.

[9]ADM 186/117, 'C.B. 3042,' p. xii.

[10]ADM 186/551, 'C.B. 3002/38,' p. 45.

ship's secondary armament.[11] This view was sustained by the premise that the aim of a fleet action was destruction, and not incapacitation, of the enemy. Better value was provided in filling an armour-piercing shell with high explosives than with a persistent or non-persistent agent which took time to take effect.[12]

That said, the Royal Navy did develop an airborne capability to deliver a chemical attack. The equipment necessary was much the same as that required to deliver a smoke screen from the air, of which, the Service practiced on a regular basis. Exercises such as 'Q.B.,' conducted by the Mediterranean Fleet in January 1932 tested the defences of heavy ships in harbour against an simulated airborne chemical attack delivered by aircraft launched from Courageous and Glorious. A spray composed of flour and sea water was dropped from a height of 100-200 feet against the anchored ships, and the conclusion reached was that:

> 177. The gas attacks fulfilled their purpose in bringing home to the personnel to some extent the nature of a mustard gas attack, and the defensive measure that are necessary.
>
> 178. The anti-gas organisation appears to be developing along sound lines. It is evident that a gas attack will not have a serious effect on a ship that is prepared to meet it, and it would probably be uneconomical to use aircraft for this purpose against a trained fleet.[13]

The chemical weapons ultimately developed included phosgene, a lethal choking agent, and mustard gas, a blistering agent deadly in high doses. Phosgene, as a non-persistent agent allowed for the rapid occupation of any area attacked, whilst mustard gas, a persistent, would be employed to deny an area to enemy personnel or preclude the

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[11]ADM 186/82, 'C.B. 3021,' p. 14.

[12]Ibid.

[13]ADM 186/151, 'C.B. 1769/32(1),' pp. 3-17.

operation of equipment. Other agents developed included diphenylamine chlorarsine, or Adamsite, and diphenyl chloroarsine. These instruments, though not usually lethal, debilitated personnel through vomiting making it impossible for personnel to wear a protective mask, and, thus, allowed other agents to take effect. In addition, a family of riot control agents including ethyl iodoaetate and chloroacetophenone were developed.[14] Given the several agents produced and their differing purposes, one can conclude that the Royal Navy had evolved at least a rudimentary doctrine for the employment of chemical weapons by the close of the interwar period.

Finally, during the Second World War, the question returned from whence it began for the Royal Navy--the use of gas as an anti-submarine measure. Whether representing a statement of truth, or merely an idle threat to be used to deter sabotaging a submarine disabled on the surface, the orders of the Second Support Group contained the warning: 'Ween sis mich widerstehen, so lose ich Giftgas in den komandoturn.'[15]

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[14]ADM 186/82, 'C.B. 3021,' pp. 15-16.

[15]'Any trouble and I will put poison gas down the conning tower!', Second Support Group, Operation 'Haggis' Glossary, p. 11, Vice Admiral Sir Peter Cazalet Papers, Imperial War Museum, IWM/P432.

APPENDIX VII

BATTLESHIP AND BATTLE CRUISER GUNNERY PROBLEMS INVESTIGATED IN THE 1919-1939 PERIOD[1]

BA. Procedure to adopted by a division when in Master Ship Control if all communications from the master ship fail.

BB. Procedure to be adopted by a consort in Master Ship Control, if the ship fails to receive any information from the master ship.

BC. Increase in Output in Concentration Using the Individual Ship Control Method.

BD. Time taken to change degree of concentration.

BE. Pair Ship Firing by Master Ship Control.

BH. Concentration on an enemy 'turning point.'

BI. Cooperation of a division during night action.

BK. Number and nature of guns required for star shell illumination.

BL. Maximum effective range of star shell from different natures of gun.

BM. The possibilities of the adjustment of the gyro firing gear on the flashes of star shell guns.

BN. Suitability of the suggested modifications to the secondary armament spotting rules.

BO. Use of secondary armaments against low flying aircraft at long range.

BP. To investigate the effect of cross fire by two ships widely separated firing at one target.

BQ. To investigate the effect on own ship's fire when frequent and large alterations of course have to be made, and to discover the best methods of compensating for own ship's movements with Dreyer fire control tables.

B1. Method of obtaining consistent spreads and good rate of fire in MSC concentration in which no breakdowns are introduced.

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[1]ADM 186/318, 'CB 3001/32,' pp. 103-107.

APPENDIX VII
(continued)

B2. The best method of compensating for own movements during alterations of course.

B3. The effects of illuminants in silhouetting ships using them.

B4. Illumination procedure with searchlights and 4-inch H.A. guns, assuming that secondary armament is not available for star shell.

B5. Use of inclinometers for 'Inc. Rate' plotting.

B6. Value of a proposed modification to the Aircraft Spotting Rules.

B7. Correction to allow for lag of rangefinder ranges, etc., with secondary armaments.

B8. Use of Eversheds at night in later ships.

B9. Deflection finding and amended rules.

B10. The suitability of Cruiser Spotting Rules for capital ships when in MSC.

B11. Suitability of proposed modification to the Aircraft Spotting Rules.

B12. Line Spotting Rules for indirect fire, and need for a Line Spotting Officer.

B13. The number of aircraft observers required for efficient observation of fire and if enemy movements in indirect fire.

B14. The suitability of the proposed modification to the single-step Spotting Rules for secondary armaments.

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